Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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C. E. R. A. Engineering Council Has Made Good Start

THE close of a very good year and the start of a promising new year were marked by the annual meeting of the Central Electric Railway Association last week. Perhaps the outstanding accomplishment under the administration of President A. C. Blinn was the actual inauguration of the long-talked of meetings exclusively for the engineers of the central territory. Similarly, one of the important things that will probably be accomplished under the capable leadership of President S. W. Greenland is the completion of the organization and scheme of procedure of the council. The important thing this past year was to get the engineers' meetings started. This has been done, and the several local section meetings and the one general session held have served to stimulate a healthy and instructive expression of experience and opinion on pertinent questions confronting the engineers.

However, there must still be some system planned whereby the discussion of each section may be brought down to definite conclusions, the conclusions of the several local sections on a subject studied jointly, and a final report drawn by a standards committee of the council, or some such body, looking toward the formulation of definite "recommended practices" or "standards" of construction based on the consensus of thought of all the engineers of the central territory. This is the thing that remains to be done to make the Engineering Council the success that it was hoped it would be. In some such way there must be avoided the repeated discussion of the same topic with divergence of views always in evidence and without making any noticeable headway. The local section meetings have already proved their worth in their stimulation of new ideas, and if a plan can be formulated now so that the meetings will be "getting somewhere" in addition to just discussing problems, the idea of the Engineering Council will have been made completely successful. This task falls in the main to the willing hands of President Greenland and second Vice-President Harry Reid, who is ex officio chairman of the Engineering Council. The chairmen of the local sections appointed during the latter part of last year will be continued through this year according to the general understanding—a further assurance of success.

Another Summer Cruise for C. E. R. A. Members

WHEN anything has been as completely enjoyed by all in attendance and has afforded as perfect a setting for a convention as the Great Lakes cruises of the Central Electric Railway Association, it was only to be expected that the association would unanimously indorse a repetition next summer. The boat trip really is a great event for this association. It affords a degree of pleasure and absolute isolation from the heavy cares of the year that can be gained in no other way. And more important, perhaps, this rest and leisure, in company with many other railway men, furnishes an opportunity for discussion of common problems or exchange of ideas and advice that is of inestimable value to the companies. Furthermore, the business program of the convention is just enough of serious purpose to keep one from forgetting altogether the work left behind that must be returned to.

So make a mental reservation now for a few days' engagement off the job at the end of June, for you will find it "the most delightful event of the year." And as usual, the association will be glad to include in the party railway men from any part of the country.

Why Eliminate Waste? Why Standardize?

LAST fall the Federated American Engineering Societies issued a committee report on the elimination of waste. If this report has caused any reaction in the electric railway field the editors of this paper have, unfortunately, seen no evidence thereof. But even though there was no specific reference to the electric railway industry, even though there was apparently no direct appeal to electric railway men, there stood out from the report for those who would see a real message, a big idea, in conservation of man power and materials for all industry. (See review of this report, ELECTRIC RAILWAY JOURNAL, Nov. 17, 1921, page 1152.)

There have been some who, lately, have seen in this report a false indictment of management. That, it appears, is a rather distorted view of the purport of the report. Rather there appears on close study an analysis, a portrayal, of what management, with its brains, can do to eliminate many of the wasteful practices of American industry—whether it be in the use of man power, of materials, of methods, or what not. There are as plainly pointed out opportunities of labor to assist in a constructive program of getting things done in a more effective order.

But the report is fundamentally the striking evidence of a broad constructive policy for the benefit of American business and American men and women. To becloud the main issue is, as one noted engineer has said, a "dis-service" to the nation.

There are two main concrete suggestions which electric railway men can get from a close study of this report. One of these is how to analyze their own work to see how to eliminate whatever waste exists. This can be learned from a study of the way in which the six "test industries" were analyzed. The other is how best to approach the problem of standardization; in other words, what standardization really means.

These two subjects, the elimination of waste and the adaptation of the principle of standardization—so far as practicable—in American industry, are the two most potent factors for the maintenance or increase in the present American standard of living. If man's effort, by reduction of lost motion, is increased 25 to 30 per

cent, he and his fellows benefit directly in proportion. If capital invested in finished product for the market is called upon to maintain a smaller number of types, it can automatically expand its usefulness.

Standard Specifications Would Appear to Benefit Everybody Concerned

IT HAS been generally taken for granted that when a group of competent engineers or others get up a set of specifications for a material, a device or a process commonly used they have accomplished something. That this assumption is warranted can be seen from a moment's consideration. Obviously the product of their deliberations is the result of the best thought and experience available. The thing or practice specified must, therefore, be better than the average thing or practice in use. If the specification is generally adopted the result will be a money saving. But if there is a failure to adopt a standard, it is partly a reflection upon the competency of the framers thereof.

In a recent number of the "Question Box," published monthly in *Aera* by the American Association, a topic raised for discussion was the desirability of standardizing small track supplies, such as bolts, spikes, nut locks, etc. A surprising result was the statement by several experienced railway men that such standardization is undesirable. In the opposite belief this paper in 1920 secured from Howard H. George, and published, a series of specifications of track details with technical explanations. The series was well received and was believed partly to fill a long-felt need. The Engineering Association committee on way matters has for years had the standardizing of these details under consideration and will, it is hoped, in due course make some definite recommendations. The result will be a better grade of supplies at the same or lower cost.

Of course, the principal valid objection to standardization is that it will stop progress. This means that it should be attempted only when it does not prevent real development. Legitimate standardization, therefore, is synonymous with judicious standardization, which in turn means applying common sense to it.

Even in New York Traction Conditions Are Improving

THE electric railway fare situation in New York City has long been recognized as the worst among the large cities in the country. No increase in fare has been permitted except that of a charge of 2 cents for transfers on the surface lines. But developments during the past week indicate that conditions are improving, even though the new Transit Commission has not yet had an opportunity to conclude its investigation and recommend a remedy. Of course, the companies cannot be considered yet as prosperous. It is not a sign of affluence for a man to be bankrupt but able to work off a portion of his debt, or for one who is nearly bankrupt to say that he thinks now that he can take care of his notes when they become due. But even these conditions are better than those of but a short time ago. The result has been brought about by economies and reduced costs of materials and labor, plus, in the case of the surface lines, a virtual increase in fare, brought about by the break-up of the lines.

Coincident with this comes the discovery by a legislative committee appointed to investigate taxes that the utilities are the most heavily taxed of any kind of industry, and the electric railways the most heavily taxed of any utility. In fact, at present, some electric railways which otherwise would show a profit are being asked to pay not only all of their net earnings, but two, three and four times that sum as taxes, and it was found that the taxes on electric railways are nearly four times as great as the corresponding taxes on manufacturing companies. If local real estate taxes are taken into account, electric railways in New York State operating at a profit pay some 44 per cent of their net income in state and local taxes. It seems that it is necessary only to call attention to this situation in order to bring about a reform; another sign that conditions are better.

Boston Makes a Remarkable Showing

ONE of the first annual reports to appear this year is the earnings statement of the Boston Elevated Railway. It is a mighty encouraging document. It speaks wonders for the management of that property and bears out in large degree the prediction in the ELECTRIC RAILWAY JOURNAL about a year ago that in the period of post-war deflation the electric railways would most likely come into their own again. This is said advisedly, of course, for many companies are still sorely beset, but even the most hardened pessimist cannot but marvel over the showing at Boston.

It will be recalled that at the end of the first year of operation of the road under the public trustees an operating deficit of about $5,000,000 had accumulated. During this time a 5, then a 7 and finally an 8-cent fare was in force. This accumulated deficit was met from the reserve fund and by general taxation in the cities and towns served by the railway. In the second year, with a flat 10-cent fare in force, the revenues practically met expenses. In the calendar year just closed receipts exceeded expenditures by about $1,117,000. The basic fare at Boston is still 10 cents, but the number of lines being operated at 5 cents is being increased constantly. Few suburban centers now remain in metropolitan Boston where it is not possible to ride within the local community for a 5-cent fare.

The trustees of the company are, of course, elated. They have every right to be. But they warn the public that under the provisions of the public control act the general 10-cent fare cannot be replaced by a lower fare until repayment has been made to the cities and towns of the amounts advanced by them to meet the deficits of the first year of public operation. In looking ahead, however, the trustees see on July 1 next prospects of surplus receipts of about $500,000 after the payment of the balance due the reserve fund. Under the statute this surplus must be used in reimbursing the cities and towns for the advances they made in meeting the previous deficits. The prospects would therefore seem bright of paying off the balance of the loan in 1923.

A particularly pleasing feature of the matter is the acknowledgment which this wonderful showing by the management has received in the daily press. In the dark days when the deficit was piling up the tendency of the press was anything but lenient, but General Manager Dana and his associates, ridiculed, sneered at and at times vilified, have, as the Boston *Post* says, come through with a very satisfactory record. Much still remains to be done. Of this Mr. Dana and the trustees are cognizant, but the fact remains that the showing for 1921 is in many respects a truly remarkable one.

The California Resolutions Regarding "Bus Transportation"

LAST WEEK the California Electric Railway Association adopted the resolution reprinted herewith and distributed it quite widely throughout the electric railway industry of the entire country.

To the editors of ELECTRIC RAILWAY JOURNAL and BUS TRANSPORTATION, the action taken by these leading and influential electric railway officials of California indicates two outstanding points, though possibly not of equal importance. The first of these is that there is a critical and fundamental problem facing the electric railway industry today in this question of the bus and just as critical and fundamental a problem facing the bus transportation industry. The other point is that the California men, who have been acquainted for years with the purposes and policies of ELECTRIC RAILWAY JOURNAL, have misconstrued or have gained an entire misconception of the facts and purposes connected with the starting of BUS TRANSPORTATION.

There is perhaps a special reason why men from California should take a viewpoint apparently so at variance with many, if not most, others. Competition between rail and bus is more bitter in California than anywhere else because of the large number of automobiles, the wonderful climate, the long, smooth, improved—and inviting—highways, and also because of the recognized injustice of jitney competition in the early days. It will be recalled that the advent of the "jitney" is credited to Los Angeles on July 1, 1914. Since that time, in a period when the population of Los Angeles has doubled and the traffic increase would normally, according to past history, be fourfold, the number of street car riders has not materially increased. With a situation so tense and at a time so critical, it can be understood that California railway companies might not take the broadest view of the situation.

But it is not in California alone that there is a problem. Everywhere in this country electric railway operators are confronted with transportation problems in which the possible place of highway transportation has an important bearing. Opinions on the bus by railway men vary from a real and growing application in both rail and non-rail territory to an uncompromising position of demanding that the word "bus" and all that it stands for be relegated to innocuous desuetude. In the eyes of many—and with this group the editors of these two papers agree—the latter attitude is one in which personal prejudice has overcome sound judgment. But that a real problem exists before the railway industry as a whole in determining its attitude toward the bus is very apparent. It is to be hoped that the industry itself will not break up its present wonderful co-operation and united effort on its common problems. But views do vary on the question and discussions on the bus are becoming more and more frequent. The American Association devoted a session of its 1920 convention to the subject; the New England Street Railway Club on Feb. 2 discussed the bus most fully, and it is both timely and fortunate that the American Electric Railway Association has placed the bus at the top of its program for the Indianapolis Midyear Conference on Feb. 28.

Resolution of California Electric Railway Association Regarding the Publication of "Bus Transportation" by the "Electric Railway Journal"

Whereas, the ELECTRIC RAILWAY JOURNAL has been supported by the electric railway industry of the United States and the co-operation of such industry and the manufacturers of electric railway supplies and equipment has made it possible for such JOURNAL to continue and be recognized substantially as the official mouthpiece of the electric railways in this country; and

Whereas, the publishers of said ELECTRIC RAILWAY JOURNAL have seen fit to foster as a part of their enterprise, a publication to be known as BUS TRANSPORTATION, dealing largely with the automobile industry in the United States, and, particularly, with reference to gasoline propelled motor vehicles carrying passengers and freight for hire in direct and unfair competition with the electric railway carriers of the country; and

Whereas, the result of such publication will be unfavorable to the interests of the electric railways of this country; now, therefore

Be It Resolved by the California Electric Railway Association and the undersigned members of such Association, that the action of the publishers of said ELECTRIC RAILWAY JOURNAL in starting said automobile publication is not to the best interests of the electric railways of the United States, and this Association and its members are resentful of said action and the support so given by the publishers of said ELECTRIC RAILWAY JOURNAL.

CALIFORNIA ELECTRIC RAILWAY ASSOCIATION,
By W. R. ALBERGER, President.
W. V. HILL, Manager.

LOS ANGELES RAILWAY CORPORATION, By W. E. DUNN, V. P.
SAN DIEGO ELECTRIC RAILWAY CO., By W. CLAYTON, V. P.
SAN FRANCISCO-OAKLAND TERMINAL RAILWAYS, By W. R. ALBERGER, V. P.
MARKET STREET RAILWAY CO., By WM. VON PHUL, PRES.
PACIFIC ELECTRIC RAILWAY CO., By D. W. PONTIUS, V. P.
SOUTHERN PACIFIC COMPANY, By PAUL SHOUP, V. P.
PACIFIC GAS & ELECTRIC COMPANY, By P. M. DOWNING, V. P.
BAKERSFIELD & KERN ELECTRIC RAILWAY, By A. G. WISHON, G. M.
SACRAMENTO NORTHERN RAILROAD, By GEO. F. DETRICK, PRES.
SAN FRANCISCO-SACRAMENTO RAILROAD COMPANY, By H. A. MITCHELL, V. P.
PENINSULAR RAILWAY COMPANY, By F. E. CHAPIN, G. M.
SAN JOSE RAILROADS, By F. E. CHAPIN, G. M.
CENTRAL CALIFORNIA TRACTION CO., By F. W. WEBSTER, G. M.
STOCKTON ELECTRIC RAILROAD CO., By F. W. WEBSTER, G. M.
FRESNO TRACTION COMPANY, By F. W. WEBSTER, G. M.
VISALIA ELECTRIC RAILROAD CO., By F. W. WEBSTER, G. M.
SAN FRANCISCO, NAPA & CALISTOGA RAILWAY, By C. E. BROWN, V. P.
PETALUMA & SANTA ROSA RAILROAD COMPANY, By E. H. MAGGARD, V. P.
SANTA BARBARA & SUBURBAN RAILWAY, By W. A. BRACKENRIDGE, PRES.
UNION TRACTION COMPANY, By S. W. COLEMAN, PRES.
SAN DIEGO & ARIZONA RAILROAD CO., By A. T. MERCIER, G. M.
NORTHWESTERN PACIFIC RAILROAD COMPANY, By W. S. PALMER, PRES.

San Francisco, California.
January 23, 1922.

Why We Started "Bus Transportation"

As to the second point emphasized by this resolution, the editors have no desire to quarrel with their long-time friends from California, nor do they suppose these friends desire to quarrel with them. But there is evidently an honest lack of understanding of the facts and purposes concerning BUS TRANSPORTATION. To start with, it should be emphasized that it was with a definite desire to be of even greater service to the electric railways and at the same time to render a service to those in the bus transportation business who have a real purpose of public service as their guiding motive that BUS TRANSPORTATION was started. The editors of ELECTRIC RAILWAY JOURNAL appreciate the compliment in the first paragraph of the resolution as to the position which the JOURNAL has been privileged to occupy in the industry and trust that it has rendered a real service. BUS TRANSPORTATION is merely an extension of that service in response to a very evident demand.

While ELECTRIC RAILWAY JOURNAL is an inde-

pendent and not an official publication, it developed as a part and product of the industry and with the benefit of the thinking and advice of the leading men in the industry. In the same spirit, and as the same sort of outgrowth of the transportation industry, BUS TRANSPORTATION has been naturally developed. In other words, BUS TRANSPORTATION is published not because the McGraw-Hill Company or its editors alone believed it to be sound for the industry, but because the electric railway men themselves, as a group, and the leading figures of the bus transportation industry have developed their own thinking to the point of desiring such a publication by a responsible organization which will emphasize the sound principles of the transportation business.

BUS TRANSPORTATION is not a publication "dealing largely with the automobile industry in the United States, and particularly with reference to gasoline-propelled motor vehicles carrying passengers and freight for hire in direct and unfair competition with the electric railway carriers of the country," but is rather one dealing with the transportation industry as to the proper application of highway vehicles to the transportation of passengers in urban and interurban areas in co-ordination and co-operation with such existing transportation agencies as may be operating in those areas. The policy of the paper is to foster unified operation in any given area and to deprecate and show the folly of the unfair and unregulated competition which has existed in many places.

Briefly, the editors of ELECTRIC RAILWAY JOURNAL have been for some time presenting bus information in the JOURNAL columns and, while this was in response to reader demand and to the signs of the times, it was limiting the strictly railway service which could be rendered and at the same time limited the bus information which could be supplied. Furthermore, it did not and could not adequately reach the independent bus transportation men who wanted a transportation publication. To start a separate publication seemed, after much careful study, to be the best solution. Many leaders of the electric railway industry were consulted as were also leading bus men. Those whose views were obtained were unanimous in commending the new undertaking, with the exception of one of the leading Pacific Coast representatives, whose comment, however, was not received until nearly Jan. 1, more than two months after the preliminary announcement on Oct. 29. Letters from many of these men were printed in the ELECTRIC RAILWAY JOURNAL in the issues of Dec. 10 and Dec. 31.

The publication of BUS TRANSPORTATION was thus undertaken with the apparent encouragement of most of those who would be interested and in the desire to render real service. There was no illusion regarding making money with the new venture, for some time to come, at least. BUS TRANSPORTATION was issued as a section to ELECTRIC RAILWAY JOURNAL to JOURNAL subscribers because it was felt that subscribers whose subscriptions had not expired should continue to have the bus information service, if they desired, without additional payment for the rest of the subscription term. That the offer has been appreciated and BUS TRANSPORTATION apparently desired is indicated by the fact that more than one-third of the JOURNAL subscribers have requested and are receiving it on that basis. While that arrangement has advantages, also, from a postal standpoint in convenience and cost of mailing, these advantages are less important than any misconception of purpose and it can easily be arranged to do what some Californians since the adoption of the resolution have suggested, namely, to "divorce" the two publications so that there will be no doubt that each stands on its own feet. This does not mean any change in staff or management, of course, nor of editorial policy, for, as the editors see it, there is only one sound policy which is possible. If the same company can operate buses and cars satisfactorily or the same interests operate steam and electric railroads with fairness to the public, it is hard to see why the same publishing company cannot properly issue a bus transportation paper and an electric railway paper.

It is gratifying to the editors, in the viewpoint they have taken, to find that the sentiment in the Central and Eastern territories, so far as it can be learned within the last four days or since they have had knowledge of the resolution, is still in accord with the move which has been made. Comments have come to the editors during this time to indicate that the expressions of opinion shown Dec. 10 and 31 are unchanged and that BUS TRANSPORTATION is performing a real service.

There should be no doubt of purpose or fact. BUS TRANSPORTATION is published to help in finding the solution of the question: where does the bus fit in. By portrayal of fact, by encouragement of good transportation practice, by dissemination of information and by support of proper regulation and co-ordination of bus transportation services, the editors hope to render such service to both independent bus operators and railway men, whether or not active in bus operation, that the attitude of California railway men will be changed and that BUS TRANSPORTATION will be recognized everywhere as the constructive agent it is intended to be.

A Purpose Clearly Defined Is Already Half Accomplished

A LARGE part of the constructive thinking of the electric railway industry comes to a head in committee work—on the properties and in the local and national associations. To be effective this thinking must be well directed, otherwise, as has been aptly said, the result will be like that from trying to operate on a track a car with flangeless wheels.

The best corrective of aimless thinking is definition. This applies to the thinking of the individual, but especially to a group, like a committee, which is trying to think in unison. This point was raised in an editorial in the issue of this paper for June 18, 1921, under the caption "The Function of Every Committee Should Be Clearly Defined." The point is reiterated now because committee activities are well under way and the committees are endeavoring to "find themselves." It would be a profitable exercise for every member of every committee to put into from ten to twenty-five words the gist of what he believes his committee ought to accomplish this year. The definitions of all members of a committee could be combined and a composite picture of the purpose would be produced. If this were done, a greatly improved quality of production would result, as compared with what is possible with less aimful planning.

One of the committees recently devoted a well-attended all-day meeting to the job of putting into crisp form the items which seemed to demand attention according to the specifications of the executive committee. The time was well spent.

Governor Miller Believes A 5-Cent Fare Possible

IN A NOTABLE address on traction affairs before the Merchants' Association in New York City last week, Governor Miller declared that in his judgment the 5-cent fare in New York "can and will be preserved." This statement was made in a constructive way. The Governor explained at length that people could not get something for nothing and could not be carried for less than the cost for their transportation, including a proper return on the honest capital. But he expressed the belief that by the "elimination of unnecessary waste and costs you can preserve, in all probability, the 5-cent fare."

All will approve of Governor Miller's courageous attitude in dealing with the traction situation in New York, but the question of a proper fare for such a large city as New York, with its constantly increasing demands for more transportation, is a very big one. Broadly speaking, there are two ways of establishing in any community a fare based on cost of service. One is first to decide upon the fare and then to adjust the service so that it can be supplied for that fare. The other is first to determine the quality of service desired and then to set the fare so as to cover the cost of that service. Of course, there are practical limitations to the extent to which each plan can be followed. Too low a fare may compel so poor a service as to discourage traffic, while too elaborate a service may also drive away traffic because it will mean a fare so high as to warrant only necessity riding. Besides comfort and frequency of cars, the cost of railway service depends, of course, upon a large number of other factors such as length of ride, amount of taxes and other burdens assessed against the companies, traffic regulation and other matters largely within the control of the authorities, or a lower fare than would otherwise be possible may be obtained through the payment by the city of a subsidy in some form.

Tradition in New York, perhaps to a greater extent than in any other city, calls for a flat fare of 5 cents on the rapid transit lines, as well as on the surface lines in Manhattan where the passenger does not change cars. While there are many arguments from the standpoint of the city against a flat fare—such as that it discourages the development of various community centers—it would probably be very difficult from a political standpoint in New York to make a change from it to a distance fare, especially on the rapid transit lines. Nevertheless, one idea long held in New York about the flat fare has disappeared, *i.e.*, that 5 cents should carry a passenger on the surface lines from any point to any other point in the same borough, and there is of course no precedent of a 5-cent fare to cover a transfer between rapid transit and surface lines, except to a very limited extent in the Borough of Brooklyn, and this has now been abandoned.

In other words, circumstances have brought around in New York City, except on the rapid transit lines, a kind of crude distance fare, and it is probably owing to this fact more than to any other that the surface lines in New York have been able to get along as well as they have during the last few years on a 5-cent fare. Theoretically, this fare may be highly discriminatory in regard to the distance which a person can ride on different lines for 5 cents. Practically, the discrimination is not so great as appears at first sight, because the speed of the surface cars is so much slower than that on the rapid transit lines that long rides on the surface system are the exception. Governor Miller did not specify in his address whether he thought his proposed flat fare should include universal transfers, between the rapid transit and surface lines, for instance. If this should be in contemplation, it would be a step backward. Such a universal fare would undoubtedly have to be higher than if such transfers were not given and hence would discourage short riding on the surface lines. During the last few years persons have not only become accustomed to paying for a transfer, but such a charge can be justified on the ground that, other things being equal, it costs more to transport a passenger who makes a transfer from one car to another than one who does not. Whatever fare system is adopted in New York City as a result of the present inquiry, an effort should be made to preserve as much of the distance fare characteristics as possible.

Association Membership Appeal Based on Both Self-Interest and Loyalty

WHY should the membership of the American Electric Railway Association support the 1922 campaign for more members, which is about to be launched? There are many reasons, but particularly two: First, the larger the association the more will each present member get out of it; second, the industry needs to have everybody in its association if it is to present a united front.

And what can the present members tell the "prospects" as to reasons for getting out of the "prospect" class? There are plenty of them and they can be divided into two groups, namely, the self-interest appeals and the loyalty appeals. Of the former the most forceful is the service which the association renders in the way of information, and to the value of which the present members can testify. This can readily be shown to be worth all that membership costs, provided that the members make use of their privileges. Again, the adequate preservation of any business depends to some extent upon all of its constituents standing together, and the association is the agency through which the electric railway industry can obtain this unity of action. This might be called the self-preservation appeal. There is also a certain prestige which goes with membership in a national association, and this prestige is proportionately greater with the small companies than the large ones.

This act of standing together has an element of loyalty also. Whether the potential usefulness of the association is capitalized or not, there is a natural feeling on the part of individuals and corporation managements that their industry needs their support. They want to be a part of any co-operative effort which the others think worth while. Of course if they do not realize that they are part of an industry, then they must first be convinced of the soundness of the idea.

This year's committee on company and associate membership plans a canvass more comprehensive than any previously undertaken among the railway, manufacturing and allied interests. The temper of the meeting held at Pittsburgh last week was one of determination to do a good job. From the reports presented by the secretary, it was evident that the present status of the membership list is excellent, but that it is susceptible to considerable improvement. Let's all help improve it.

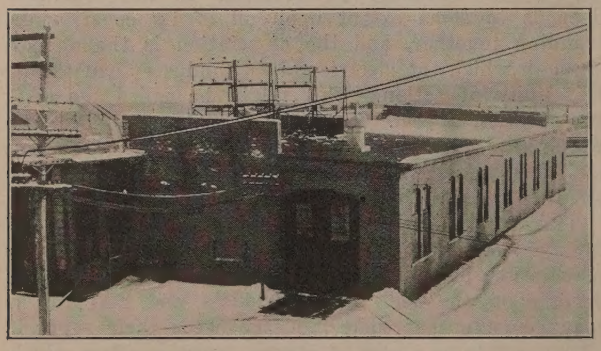
Automatic Substation Practice at Concord, N. H.

Local Traction System, Serving the Capital City of the Granite State, Utilizes Two Installations of Labor-Saving Type with Noteworthy Reduction in Operating Expenses at Small Investment Cost

THE use of non-attendance substation equipment by the Concord (N. H.) Electric Railways illustrates the effectiveness of this method of power distribution from the point of view of economies in operating expenses. This railway operates about 31 miles of single track, with a maximum car schedule of twenty-five units and a minimum of fourteen. Serving the capital city of the Granite State and its surroundings, the road utilizes hydro-electric energy generated at Franklin, N. H., and the car service is operated by 600-volt direct current obtained from motor-generator sets and rotary converters located in substations formerly operated with manual control. An investment of $9,300 has yielded an annual saving in operating labor cost of $6,750. Thus the entire first cost of the automatic equipment will be liquidated in less than eighteen months.

Two substations are in service with non-manual operation. The first of these, located at the southern end of the city of Concord and called the "South End" substation, was installed in November, 1920. The other, or so-called "West Concord" substation, was installed in June, 1921, and is situated in a former steam-plant structure still containing reserve boilers and engine-driven generating machinery, located about 2 miles outside the urban center on the northern side of the community. The first substation is started manually and the second is equipped for full automatic operation.

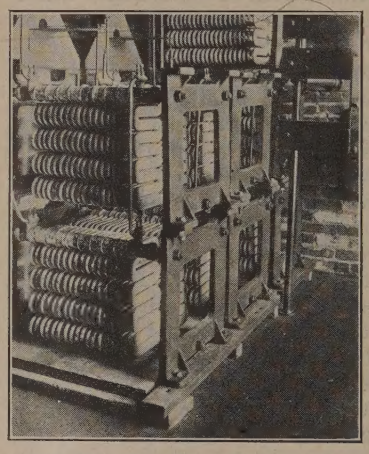
The South End substation is housed in a section of the company's general repair shop building. The automatic equipment here was furnished by the Automatic Reclosing Circuit-Breaker Company, Columbus, Ohio. Power is delivered to this substation at 22,000 volts, and



SOUTH END SUBSTATION AT CONCORD IS HOUSED IN A SECTION OF THE REPAIR SHOP

two sets of 150-kva. transformers supply current at 385 volts to two 300-kw. Westinghouse rotary converters. Two 22,000-volt, three-phase circuits connect the substation with the Franklin hydro-electric plant, nineteen miles north of the city, and also furnish energy for the lighting and power required at the Concord shops of the Boston & Maine Railroad, adjacent to the substation, and in addition for a number of towns north of Concord, including Newport, Warner and Bradford.

The equipment at the South End substation is standard for this service and is centralized on four switchboard panels, two of which are assigned to machine service and two to feeders. From this substation local service to the railroad shops is also controlled. Two feeder breakers, two machine breakers, two thermostat relays on the rotary converter bearings and two speed-limiting devices comprise the principal automatic equipment, and a striking feature of the installation is its compactness. The breakers occupy small square panel sections at the top of the regular panels, and very little difficulty was experienced in changing over the substation from all-manual operation. There has been no outlay for repairs since the installation went into service, and beyond a regular weekly inspection nothing in the way of overhauling has been required.



MOTOR STARTING RESISTORS IN WEST CONCORD AUTOMATIC SUBSTATION

Two Anderson time-clock switches are provided so that either rotary can be shut down at a predetermined hour, separately or together. These shutting-down times are governed according to anticipated traffic and work-car conditions, but usually in the small hours of the morning both units are out.

The cost of this automatic equipment was about $1,400 per unit, or $2,800 for the substation.

WEST CONCORD SUBSTATION IS FULL AUTOMATIC

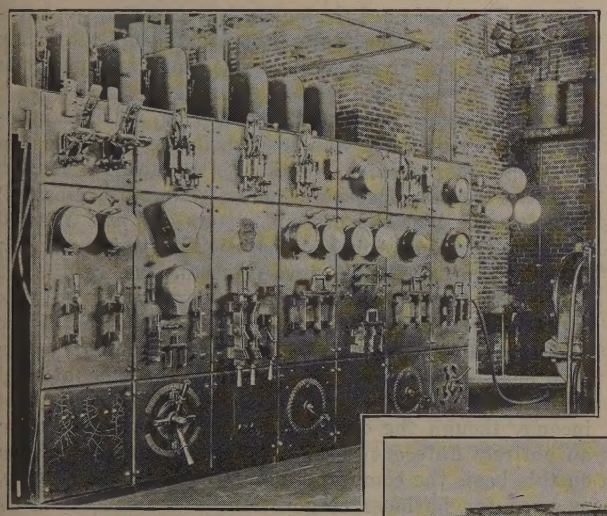
The West Concord substation also receives power from the double 22,000-volt transmission line from Franklin. This is a complete Westinghouse installation which occupies a space only about 15 ft. wide by 30 ft. long at one end of the auxiliary steam plant. One 300-kw. motor-generator set is in use here, the unit consisting of a 600-volt direct-current generator direct-driven by a 2,300-volt synchronous motor. This unit is provided with a shaft extension so that it can be engine-driven in emergency. Three 150-kva. transformers supply energy to the motor. One of the illustrations shows the direct-current end of the motor-generator and a "close-up" of the thermostatic switch attached to the bearings, arranged to shut down the machine in case of overheating. A general view of the switchboard is shown in another illustration and details of the relay panels in a third.

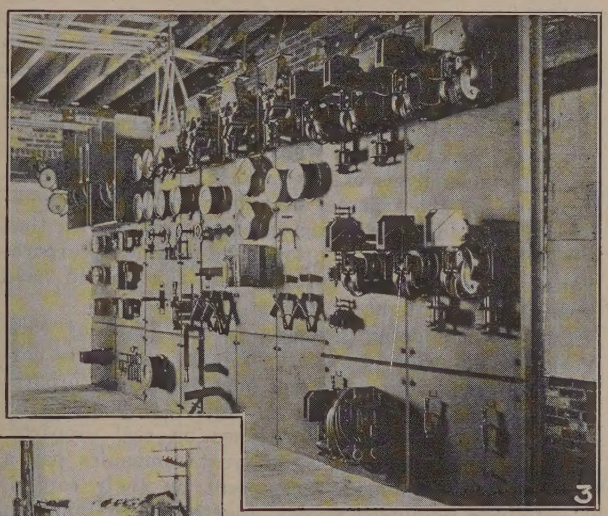
In this substation, as at the South End, existing equipment was utilized in the way of conversion apparatus, but four new switchboard panels were required. Two of these have been mounted at the left-hand end of the board and two at the right-hand end. The former are used chiefly to carry the automatic relays required for

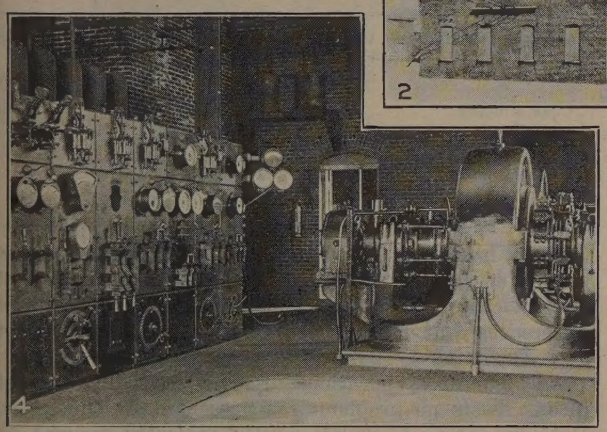
the various opening and closing operations, the latter being used in connection with the mounting of feeder circuit breakers.

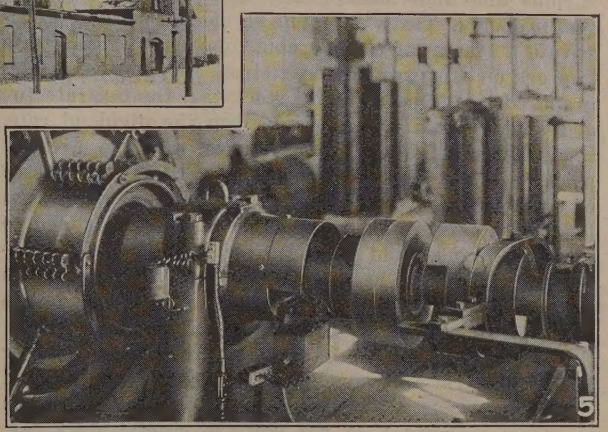
The equipment which was used in the automatic operation of the substation is of the usual type, but a new feature has been added in the shape of a relay which opens the machine direct-current contactor before the alternating-current contactor, preventing arcing which otherwise might result from opening the 2,300-volt circuit under load. The installation is also designed so

The load requirements and prospects of the road do not indicate the necessity for installing further equipment for automatic service, but the results have been most satisfactory. The total cost of the two installations is about $9,300 (the translating and transforming equipment and original switchboard panels being utilized without additional outlay for such new apparatus). To operate these substations by hand involved three men in summer and four in winter, at a total annual wage outlay of $6,750 more than is now necessary. Besides









SUBSTATION VIEWS, CONCORD, N. H., ELECTRIC RAILWAYS

No. 1. Automatic reclosing circuit breaker equipment installed in substation.
No. 2. West Concord automatic substation.
No. 3. Automatic control apparatus at West Concord substation.
No. 4. 300-kw. rotaries and automatic switchboard apparatus installed in South End substation.
No. 5. This coupling provided for engine drive of rotaries in case of power failure.

that by a slight change in wiring on the rear of the panels the equipment can be adapted at once to all-manual operation if desired. At one end of the board is mounted the motor starting resistance.

Aside from the electrical changes effected in this substation, heavy wire screens were provided on the windows to prevent unauthorized entrance and possible danger to trespassers. An asbestos mat ¼ in. thick was also laid on a platform placed directly in front of the board.

The approximate cost of the switchboard equipment and control apparatus for this substation was $6,500, providing complete automatic operation. As at the South End substation, a weekly thorough inspection suffices.

this, the improvement in voltage regulation and reduced drop secured through welded bonding of the track have decreased the amount of energy purchased for the southern suburban line service from the Manchester Traction, Light & Power Company to a large extent. J. B. Crawford is general superintendent of the Concord Electric Railways.

The American Engineering Standards Committee has approved as tentative "American standards" the specifications of the American Society for Testing Materials for cold-drawn bessemer and open-hearth steel automatic screw stock, and methods of chemical analysis of manganese bronze and bronze metal.

New York Electric Roads Pay High Taxes

Investigation by a Legislative Commission Shows that Under the Present Complex System of State Taxation the Electric Roads Pay a Much Larger Percentage of Their Net Income in Taxes than Other Kinds of Business

BY FREDERICK C. MILLS
School of Business, Columbia University

AN INVESTIGATION just completed by the joint legislative committee on taxation and retrenchment of New York has revealed certain facts of general interest concerning the condition of public service corporations in New York State. The statistical report of the committee, which was issued on Jan. 25, presents an analysis of the burden of state and local taxes on the chief classes of public utilities and compares the tax burden borne by these groups with that borne by financial institutions and business corporations. Some startling variations in tax burden have been brought to light by this study.

Corporations doing business in the State of New York are subject to a variety of taxes. Business corporations (*i.e.*, mercantile and manufacturing corporations) are subject to a straight tax of 4½ per cent on their net income, plus local taxes on real property. National and state banks and trust companies pay a tax which amounts to 1 per cent on their capital, surplus and undivided profits, together with taxes on real property. Taxes on public service corporations constitute a system of considerable complexity. The State imposes on steam railroads and on telephone and telegraph corporations a capital stock tax, the tax rate for a given corporation depending upon the dividend rate, the relation of assets to liabilities, and the average price of the stock sold. In addition, these two classes of corporations pay a tax of ½ per cent on their gross intrastate earnings, a term which has been defined to mean earnings from business originating and terminating within the State. Gas and electric companies are not subject to the capital stock tax, but pay to the State ½ per cent on gross earnings, plus 3 per cent on the amount of dividends declared in excess of 4 per cent. Electric railways (not including underground electric railways, which are taxed upon the same basis as steam railroads) do not pay the capital stock tax. The gross earnings tax for this group is at the rate of 1 per cent, and they pay a tax of 3 per cent on dividends in excess of 4 per cent.

LOCAL TAXES MUST BE PAID ALSO

In addition to these state taxes all public utilities are subject to two local taxes, a general franchise tax and a general property tax. The basis of the former is the value of the tangible property in the streets, highways and public places, plus certain intangible elements, the value of the latter being determined annually by the State Tax Commission. Considerable litigation has arisen in connection with these special franchise valuations. The general property tax is levied upon all real and personal property, excluding that which is assessed with the special franchises.

Merely to enumerate these taxes gives some idea of their complexity, though it does not indicate all the difficulties involved in their administration, both for the tax authorities and for the corporations subject to them.[1] The objects of the legislative committee on taxation were the simplification of this complicated tax system and, so far as possible, the equalization of the tax burden.

In the determination of the tax burden a double problem was involved. It was desired, in the first place, to determine the relative weight of the tax burden on different classes of corporations. It was also essential to determine how the present system of taxes affected the different individual corporations within a given group. The statistical investigation, the results of which are now available, was undertaken with this double object in mind. Net income was adopted as the best available standard of tax-paying ability. For each class of corporations, therefore, the amount paid in taxes has been expressed as a percentage of net income, though the original levy may have been upon an entirely different base. In making the comparison on this basis the committee points out that net income, as used for business corporations and financial institutions, is not in all respects identical with the net income of public service corporations. It is held that general comparison is possible in spite of these slight differences, but that refined comparison would be out of order.

TABLE I—GROUPS OF UTILITIES CONSIDERED, WITH NUMBER OPERATING AT PROFIT

Class of utility	Total Number of Corporations	Number Operating at a Profit	Percentage Operating at a Profit
Steam railroads	60	43	71.5
Electric railways	56	34	60.7
Telephone and telegraph	66	62	94.0
Gas and electric	108	97	89.8
Total	290	236	81.5

As business corporations are now taxed upon a net income basis no problem was presented by this class. Data regarding financial institutions were secured by means of questionnaires sent to all banks, trust companies, investment companies and savings banks in the state. Replies were received from 93 per cent of the total number in the State. The ratios as finally worked up for this group were based upon averages for the three years 1918, 1919 and 1920. The primary sources of information regarding public service corporations were the reports of these utilities to the Public Service Commission and to the State Tax Commission. For each class of public service corporation a representative sample was selected from among those corporations for which records were complete for the ten year period 1911-1920. The ratios were worked out on the basis of ten-year averages for this sample group.

Preceding the general discussion of tax burden in

[1] In order to determine what the expenses of complying with the present tax laws amounted to, the committee circularized all the public service corporations in the State. For 330 corporations replying, the expenses involved in paying taxes and contesting assessments amounted to $366,785 annually. (This does not include, of course, the amounts paid in taxes.) Of this total $175,381, or 48 per cent, had to do with the special franchise tax.

the report of the committee are figures showing the number of corporations included in the samples on which the ratios are based, and the number and percentage in each class operating at an average profit over the whole period covered. The figures presented for the four chief utility groups are given in Table I.

Telephone and telegraph companies show the highest percentage operating at a profit, while electric railways show the lowest percentage.

Relation of Taxes to Net Income with Different Utilities

In measuring tax burden, the committee first sets up a comparison between the individual corporations within each of the given groups. When total taxes, state and local, are expressed as a percentage of net income, the ratios for individual electric railways vary from 15 per cent to 625 per cent. That is, there is one company for which total taxes amount to 15 per cent of net income and there is another company, at the other extreme, for which taxes amount to 625 per cent of net income.[3] The other companies lie between these two limits. The figures demonstrate beyond question that the present system of taxing electric railways results in marked inequalities of burden within this group. The actual distribution is shown in Table II.

TABLE II—RELATION OF TOTAL STATE AND LOCAL TAXES TO NET INCOME, ELECTRIC RAILWAYS IN NEW YORK STATE

Based upon the average annual tax payments and the average annual net income during the period of 1911–1920.

Class[3]	Number in Class	Number Showing Deficit	Number Paying: Less Than 50 per Cent	50 per Cent to 99 per Cent	100 per Cent to 149 per Cent	200 per Cent to 249 per Cent	250 per Cent to 299 per Cent	600 per Cent to 649 per Cent
			Percentage of net income paid in taxes					
A	10	3	4	2	1	..	..	..
B	27	8	10	4	1	..	3	1
C	19	11	4	1	2	1	..	..
Total	56	22	18	7	4	1	3	1

Of the eighteen corporations paying less than 50 per cent of their net income in taxes two pay from 15 to 20 per cent, one from 20 to 25 per cent, two from 25 to 30 per cent, four from 30 to 35 per cent, five from 35 to 40 per cent and four from 45 to 50 per cent.

Within the electric railway group wide variations in tax burden are found. When an average ratio of taxes to net income is worked out for the electric railway group as a whole and compared with similar ratios for the other utility groups significant inequalities are also found. These ratios are shown in the following table:

TABLE III—RATIO OF AGGREGATE STATE AND LOCAL TAXES TO AGGREGATE NET INCOME, PUBLIC SERVICE CORPORATIONS IN NEW YORK STATE, 1911–1920

Class of Utility	Number of Corporations Included	Ratio of Taxes to Net Income (Expressed as a Percentage Relation)
Steam railroads[4]	109	28.2
Electric railways	56	56.5
Telephone and telegraph	66	16.2
Gas and electric	108	24.1

[2]Net income before taxes have been deducted is the basis of comparison. Thus a ratio of 320 per cent means that a company showed a profit before taxes were paid, but that taxes wiped out this profit and left the company with a deficit. The ratios given, of course, apply only to companies showing a profit before taxes have been paid.

[3]Class A corporations are those with operating revenue $1,000,000 or over. Class B those with operating revenue from $100,000 to $1,000,000. Class C those with operating revenue less than $100,000.

[4]The figure for steam railroads is based upon an eight year average, 1911-1919, excluding 1916, for which adequate tax figures were not available. Returns from forty-nine lessor railroads have been included in establishing the above ratio.

This table shows that, for the fifty-six electric railways included in the sample, total taxes to the State of New York and to the localities within the state amounted to 56.5 per cent of net income[5] over the ten-year period 1911-1920. This ratio is exactly twice as large as that for steam railroads, the group closest to the electric railway group. For gas and electric companies taxes constitute 24.1 per cent of net income and for telephone and telegraph companies 16.2 per cent.

When companies showing deficits are excluded and ratios worked out for the profitable companies only, the results given in Table IV are secured.

TABLE IV—RATIO OF AGGREGATE STATE AND LOCAL TAXES TO AGGREGATE NET INCOME, PUBLIC SERVICE CORPORATIONS OPERATING AT A PROFIT

Class of Utility	Number of Corporations Included	Ratio of Taxes to Net Income (Expressed as a Percentage Relation)
Steam railroads	87	27.3
Electric railways	34	44.4
Telephone and telegraph	62	16.2
Gas and electric	97	23.0

The electric railway ratio is reduced to 44.4 per cent, but the general relations between groups remain the same. The burden on the electric railways, measured by the standard of net income, is shown to be distinctly heavier than on any of the other utility groups.

Inasmuch as state and local taxes are assessed and collected by different agencies and are levied on different bases the committee desired to determine the relative burden of taxes paid directly to the state, excluding the local property taxes. Table V contains the ratios given in the report, based upon returns from profitable companies only.

TABLE V—RATIO OF AGGREGATE STATE TAXES TO AGGREGATE NET INCOME, PUBLIC SERVICE CORPORATIONS OPERATING AT A PROFIT

Class of Utility	Number of Corporations Included	Ratio of State Taxes to Net Income (Expressed as a Percentage Relation)
Steam railroads	87	2.65
Electric railways	34	6.35
Telephone and telegraph	62	4.10
Gas and electric	97	2.80

Although the ratios are smaller, differences no less pronounced appear when this comparison is made. For electric railways taxes paid to the State constitute 6.35 per cent of net income. Telephone and telegraph companies show a ratio of 4.1 per cent, while for gas and electric and steam railroad corporations the ratios are materially lower.

Comparison with Business and Financial Institutions

It is apparent that, as between the different utility groups, the burden of present taxes falls most unequally upon the different corporations affected. Results equally significant are secured when the taxes paid by public service corporations are compared with those paid by business corporations and financial institutions. It is to be expected, of course, that the ratios would be higher in the case of public utilities, as these corporations have traditionally served as tax collectors for the state. To a certain extent this function has been recognized by the rate-making authorities in establishing rates for public service corporations, and some of

[5]Net income used as a base is, in each case, net income allocated to New York. Main track mileage has served as the allocation basis for steam and electric railroads. Wire mileage and the location of assets have served for telephone and telegraph companies.

these taxes are passed on. Recognizing that such differences exist, however, the committee wished to determine what the present burden amounted to for these various corporate groups.

As the basis for this comparison the net income tax paid by business corporations was used. This amounts to 4.5 per cent of net income, or, to make the comparison exact, 4.3 per cent of net income before property taxes have been deducted. Corporations paying this tax are relieved of all other taxes except those on real property. For the purpose of comparison all taxes paid to the State by public service corporations, plus taxes on personal property and taxes on intangible elements in special franchise valuations, were taken to correspond to this business corporation tax. For financial institutions the bank stock taxes paid by national and state banks and the franchise taxes paid to the state by savings banks, trust companies and investment companies were accepted as equivalent to the business corporation tax.

In making a comparison of the tax burden borne by these different classes of corporations the committee points out that, because of certain differences in the definition of net income and in the number of years used as base in the study of the different groups, the ratios for the different classes should be used to establish general relations only. This applies particularly to the comparison of financial institutions with public service corporations. The ratios presented in Table VI should be studied with this caution in mind.

TAX RATIOS OF ELECTRIC RAILWAYS HIGHER THAN THOSE OF OTHER CORPORATE CLASSES

With the exception of investment companies and steam railroads all classes of financial institutions and public utilities are seen to be paying more in non-property taxes than business corporations. The ratio for the electric railway group is markedly higher than for any of the other corporate classes.[6]

The inequalities in tax burden revealed by this study have raised questions as to the advisability of fundamental alterations in the present system of taxing corporations in New York State. It has been demonstrated that under the present complex system pronounced inequalities have developed, both within each corporate group and between groups. The committee has developed a constructive program looking toward the elimination of these inequalities and the general simplification of the tax system. The action of the Legislature upon the proposals of the committee will be awaited with interest.

[6]It should be noted that the high ratio for electric railways is due in part to the character of the standard adopted. Although the committee adopted net income as the best available standard by which to measure tax burden, certain defects in that standard are pointed out. A part of the report is devoted to an examination of the relation between taxes, net income and gross income, the latter being the sum of operating revenues, less expenses, and non-operating income. Gross income deductions (interest and rentals) amounted to 74.3 per cent of gross income for electric railways, 57.1 per cent for steam railroads, 38.9 per cent for gas and electric corporations and 22.6 per cent for telephone and telegraph corporations. These figures indicate that electric railways raise relatively more of their capital by borrowing than do the other utility groups. If all capital were raised by borrowing net income would disappear, and the ratio of taxes to net income would be infinitely large. The greater relative importance of this method of raising capital in the case of the electric railways serves to increase the ratio of taxes to net income.

The committee has worked out certain ratios based upon the relation of tax accruals to net and gross income, in order to determine the effect of these deductions from gross income upon the tax ratio. The tax accruals in this case relate to all taxes, not to New York taxes alone; no allocation to New York has been made in the net income figure used.

Class of Utility	Ratio of Tax Accruals to Net Income	Ratio of Tax Accruals to Gross Income
Steam railroads	22.71	11.13
Electric railways	37.71	13.46
Telephone and telegraph	9.09	7.17
Gas and electric	19.10	12.58

It is apparent that when the ratio of tax accruals to gross income is determined the wider discrepancies found on the net income basis are ironed out, though they do not entirely disappear. The electric railway ratio is greater in each case than the ratios for the other groups.

TABLE VI—RELATION OF TAXES TO NET INCOME, BUSINESS CORPORATIONS, FINANCIAL INSTITUTIONS AND PUBLIC SERVICE CORPORATIONS IN NEW YORK STATE

(All taxes other than those paid on real estate property are included)

Class of Corporation	Ratio of Taxes to Net Income, (Expressed as a Percentage Relation)
Mercantile and manufacturing	4.30
National banks	6.80
State banks	6.58
Trust companies	7.33
Investment companies	3.13
Savings banks	5.80
Steam railroads	3.88
Electric railways	15.60
Telephone and telegraph	7.20
Gas and electric	7.40

Letters to the Editors

Standardizing the One-Man Car

BROOKLYN, N. Y., Jan. 30, 1922.

To the Editors:

Although averse to a controversy over the merits of several types of one-man cars as related to the broad subject of standardization, I believe, after reading the letters of Messrs. Clark and Palmer, in the ELECTRIC RAILWAY JOURNAL for Jan. 28, that it would be inadvisable for the writer to drop the matter without a more emphatic and direct indication as to where these gentlemen, as well as many others, err.

It is difficult to reconcile the thought conveyed in the very able and complete editorial headed "Standardization Is Essential to Prosperity," published in the Jan. 7 issue of the ELECTRIC RAILWAY JOURNAL, with Mr. Palmer's comments regarding the problem of the Transportation & Traffic Association, in so far as they apply to one-man cars.

Mr. Clark has by no means grasped my viewpoint, as I have not said that the Birney one-man car is the last word in standardization. I believe that there never will be a last word in any form of standardization. Unfortunately, however, in the electric railway industry, standardization, as generally understood, seems to have been applied specifically to detailed parts rather than to complete units. This is not desirable because in any problem it is most essential that the general principles should be defined and clearly understood before an attempt is made to determine underlying details. If this principle was followed as regards electric railway rolling stock, it would decrease the large variety of cars now in service, many of them having originated through the whim and caprice of local railway employees in charge of the maintenance and operation of rolling stock.

The results are that after more than a quarter of a century of operation we find ourselves still confronted with a wide divergence of opinion and absolute lack of uniformity in car design. This condition does not refer particularly to Baltimore or Chicago, as they are little different from many other communities. I have referred to these specific examples only because of their prominence as examples in departing from the

nearest approach to a standard car for city and suburban service than has been developed so far.

The best answer to Mr. Palmer's criticism of the applicability of the Birney car to general operating conditions is the fact that it is used throughout the United States in hundreds of communities with a population ranging from a few thousand inhabitants up to nearly 7,000,000, and that there are approximately 8,000 safety cars in service today. Furthermore, their operation has undoubtedly opened up the very broad field of one-man car operation, so that it seems probable that within the next ten to fifteen years, and no doubt much sooner, at least 80 per cent of the entire electric railway rolling stock will be handled upon the one-man principle.

Last year the writer, with one other railway employee, had the pleasure of co-operating with a manufacturers' committee whose purpose was to further the standardization of one-man cars. Considerable progress was made in spite of the many and diversified interests involved. Manufacturers must be ready to build any type of vehicle that the customer specifies, but it is hard to understand why specific designs of cars on the part of the railway company can be justified, except perhaps within communities where it is necessary to satisfy influences outside rather than within the corporation itself.

Mr. Clark's statement that the selection of the proper type of car should be decided from the operating standpoint by the operating man is indeed a fallacy. As car equipment is constantly in evidence before the public, purchases should be made with due regard to local public opinion, but careful consideration should also be given to avoiding unnecessary additions to the capital account, which mean much to the owners of the property.

WILLIAM G. GOVE,
Past-President American Electric Railway Engineering Association.

Douglas Fir as Tie Timber

WEST COAST FOREST PRODUCTS BUREAU

SEATTLE, WASH., Jan. 25, 1922.

To the Editors:

I regretted to see in the editorial "A Long Way to Go for Ties" in your Dec. 17 issue that you referred to the Doublas fir tie as "an inferior tie rated low in the scale of mechanical property ratings of lumber."

All softwoods are "inferior" to oak, for instance, in mechanical resistance, and hardwoods and all other softwoods, untreated, are "inferior" to cedar, redwood and cypress in durability, although these woods do not rank high in mechanical resistance. For fear, however, that some of your readers may understand the term "inferior" to refer to Douglas fir in the scale of softwood species, I would like to call your attention to a few facts in regard to Douglas fir.

One-fourth of all the standing timber in the United States is Douglas fir and it is rapidly coming to be a wood of prime importance in the East as well as in the West. It grows in mountainous country and this means that it grows at altitudes varying from sea level to 4,000 and 5,000 ft., under varying conditions of soil and rainfall and with varying exposure to the north and south and east and west on various slopes of the main ranges and their lateral spurs. As a consequence, there is a variation in type from rapid growth light-weight wood to close-grained dense material. Tables of species values, often unfortunately for Douglas fir, are based on the average of all types of Douglas fir, and their comparison with hardwoods and even with other softwoods does not give an accurate reflection of values which would apply to the types of Douglas fir which should be selected for various uses.

The Forest Service recognizes the above fact and in its correspondence gives proper comparisons and has now under way the preparation of matter which will put this information in proper published form.

Then again, referring directly to ties, Eastern railroads have for years used the highest type of wood structure for tie purposes and have considered white oak and chestnut as such. Western roads, on the contrary, perhaps because of the length of their lines through undeveloped territory and the necessity of seeking lowest first cost, have used the poorest section of the log, and the Western lumber manufacturer has considered the railroad tie as the outlet for material which could not go into any other grade.

As a consequence, data on Eastern and Western tie experience have been based on these uncomparable types, and the first Douglas fir ties which went into Eastern territory were of this character and undoubtedly gave an erroneous impression of the Douglas fir tie in many quarters.

Douglas fir is most comparable to and is classed by the Forest Service with the Southern pines, and Douglas fir of the rate of growth and density of longleaf pine has comparable strength in practically all properties with the type of Southern pine that is commercially known under this species name.

C. J. HOGUE, Manager.

EDITORS' NOTE: In his comment on the editorial printed in the Dec. 17 issue, Mr. Hogue brings out some valuable information regarding Douglas fir. This editorial was not designed to disparage the use of Douglas fir. It stated that 8 per cent of the ties used in the United States are made of this species of wood. It may be classed next to the oak, chestnut and longleaf yellow pine, especially in view of its seven years' estimated untreated life. The term "inferior" as it was used in the editorial was intended in the broad technical sense in which railroad men are prone to class all ties which are inferior in any way to white oak, longleaf yellow pine or chestnut as "inferior ties." Hence as used in the editorial "inferior" means simply "lower in rating."

The editorial reference to mechanical rating of timber was taken from the "Cross Tie Bulletin" for Feb. 15, 1921, page 6. The "scale of hardness" table referred to was from Bulletin 556 of the United States Department of Agriculture. This scale may be taken to indicate relative resistance to rail wear and need for mechanical protection.

It may be taken for granted that hardwood makes the best ties, particularly white oak, bur oak and chestnut. These are considered as the standard in railroad terms and any softwood is considered "inferior" for tie purposes. In the C., B. & Q. R.R. classification of tie timber for use with or without preservatives, the Douglas fir is classed as No. 4 in the softwood, treated class, being thus "inferior" to cedar or cypress, which do not call for treatment. This matter was discussed in the issue of this paper for Feb. 15, 1919, page 311, Table II. In the hardness scale white oak stands 1060 and Douglas fir 470. There are twelve species of wood of harder grades between the two.

Great Interest at C.E.R.A. Annual Meeting

Considerable Information on Light-Weight Interurban Cars, Wheel Welding, Current Collectors, Track Maintenance, Pick-up and Delivery Freight Service and Publicity Brought Out in Papers and Discussion—Boat Trip Approved—S. W. Greenland Elected President

TWO hundred and fifty strong, railway men and supply men attended the annual convention of the Central Electric Railway Association at Indianapolis, Jan. 26 and 27. The meetings were notable for the great interest displayed in the subjects covered by the instructive program, the general harmony, good spirit and good time that prevailed under the able direction of President A. C. Blinn, Akron, Ohio.

Of the business transacted, the election of Samuel W. Greenland, Fort Wayne, Ind., as the new president is of outstanding importance. And perhaps next in order of popularity, if not serious import, was the almost unanimous approval by the convention of another boat trip for the summer meeting, as expressed in adopting a resolution recommending the boat trip to the executive committee. President Greenland appointed as members of the hotel and arrangements committee "Judge" S. D. Hutchins, Westinghouse Traction Brake Company, Columbus, Ohio, chairman; "Commodore" John Benham, International Register Company, Chicago, secretary; Harry L. Brown, ELECTRIC RAILWAY JOURNAL, Chicago; C. Dorticos, General Electric Company, Chicago, and James H. Drew, Drew Electric & Manufacturing Company, Cleveland, Ohio. They were instructed to report to the executive committee as to the cost and plan of the trip, and the executive committee will then determine whether the boat trip is "on" or "off" for 1922. But it may be said that the boat trip is practically assured.

Reporting to the executive committee on last year's boat trip, the hotel and arrangements committee showed total receipts of $16,256. The settlement with the boat company required $15,321.15 and miscellaneous expenses amounted to $583.51. Refunds for tickets sold but unused amounted to $461, leaving a deficit of $109.66.

The executive committee discussed the advisability of increasing the number of meetings from two to three a year, the convention having approved the opposite change last year, but the committee decided against such an increase now. Plans for next year were also discussed and several new memberships approved. Abstracts from the report of Secretary L. E. Earlywine appear on page 193.

A feature of the program was the banquet on Thursday evening, at which all serious thought was abandoned and the guests were most enjoyably entertained by W. L. Wilkie, attorney for the Northern Ohio Traction & Light Company, Akron, Ohio, and Thomas Hendricks, Cleveland. Mr. Wilkie's one serious thought was to urge more effort toward popularizing the electric railways. Mr. Hendrick's message, sprinkled in with a most humorous relation of the famous story of David and Goliath, in terms of 1922 language and interpretation, was to urge faith in one's self and one's work, the spirit of sacrifice that generates loyalty, and love of one's job for the job's sake. For by radiating these attributes, he said, we can do more than kings and potentates for the bettering of ourselves and our industry.

SAMUEL W. GREENLAND

The first session, Thursday morning, was given over to the address of the president, the business transactions and a paper on light-weight cars for interurban service. In the afternoon the Engineering Council had charge of the meeting and G. T. Seely, Youngstown, Ohio, as chairman of the council, presided. Papers on welding steel wheels, trolley contact devices and reclaiming tracks were read and discussed. Friday morning there was a paper by Mr. Ackerman on joint freight service by an interurban line and a trucking company and an address by Labert St. Clair on how to win public approval. The address of the president and these several papers appear elsewhere in this issue. The last business transacted before adjournment was the election of officers.

The nominating committee, which is composed of Charles L. Henry, L. G. Parker, G. K. Jefferies, W. S. Rodger and G. T. Seely, reported its choice at this time as follows, the convention making the elections by unanimous ballot: President, Samuel W. Greenland, vice-president and general manager Indiana Service Corporation, Fort Wayne, Ind.; first vice-president, James P. Barnes, president Louisville (Ky.) Railway; second vice-president, Harry Reid, president Interstate Public Service Company, Indianapolis, Ind. The following members of the executive committee were also elected: Robert I. Todd, A. C. Blinn, H. A. Nicholl, C. N. Wilcoxon, W. S. Rodger, F. W. Coen, J. F. Collins, M. B. Lambert, F. N. Root, G. T. Seely and W. K. Morley.

Considerable interest was expressed following the reading of Mr. See's paper on "Light-Weight Interurban Cars," that it has been possible to develop a light car satisfactory for interurban service. Although there was much misunderstanding evident in the discussion as to the distinction between cars for suburban service and those for interurban service, all concurred that there is an opportunity for lightening interurban cars generally. It was brought out that there are very few possibilities of carrying the standardization to any such degree as has been done with the safety car; on the contrary, it was realized that rolling stock for interurban operation must be designed with more attention to the conditions on each individual property. Some of those operating high-speed interurbans could not be convinced that cars as light as those described by Mr. See could satisfactorily comply with their conditions of speed and safety. However, they were ready to reduce car weights wherever possible and to conform to the best modern engineering practice.

Several instances were cited where light-weight cars are giving good or better service than heavier cars which they replace and at but a fraction of the cost. Excellent results have been obtained on the Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, where 26,000-lb., 44-ft. interurbans equipped with four 45-hp. motors are being operated. After being operated 3,500,000 miles during the four years that they have been in use, the equipment is still in good condition. Their maintenance cost has been but

1¼ cents per car-mile over this four-year period and there have been no armature repairs during the last three and one-half years. These cars use but 1 kw.-hr. per car-mile. Another company was reported to be operating some 14-ton cars which are otherwise the same, but have a maintenance cost of but 1¼ to 1½ cents per car-mile. The Kentucky Traction and Terminal Company, is replacing its old interurban equipment, which is still in good condition, with 12-ton forty-four passenger cars equipped with four 25-hp. motors. These cars will make a schedule speed of 22 m.p.h. and the present headway of one and one-half hours will probably be cut to one hour and possible to three-quarters of an hour on account of bus competition. The cost of this equipment was between $10,500 to $11,000.

Discussion of Welding Wheels

A discussion of the economics of building up flanges by electric welding versus only turning them, by R. C. Taylor, superintendent of equipment Michigan Railway, Albion, Mich., was presented in his absence by Mr. Earlywine. Mr. Taylor based his comparison on the cost per unit of wheel diameter for the purchase price plus the additional maintenance expense on the wheel during its life. On this basis he showed that for a 37-in. wheel the cost was 68 cents per unit for the welded wheel as against only 52 cents for the turned wheel. Similarly, for a 36-in. wheel, he showed the comparative figures to be 80 cents for the welded wheel and 64 cents for the turned wheel. He maintained that it was entirely meaningless to compare wheel costs on the basis of car mileage or wheel mileage. He noted that the mileage ratio obtained from the welded wheel as compared to the non-welded wheel in Mr. Sigler's paper was 1.16 to 1 and in Mr. Gunn's paper was 1.4 to 1. He said, however, that as the mileage or work cost is higher for the welded wheel, this advantage in mileage ratio may be of doubtful value.

Mr. Taylor also said that in endeavoring to reduce the cost of wheels per unit of work performed, the mechanical men have plenty of room for experimenting and discussion. He recalled what a great improvement has been made in the steel wheel since its introduction. Further improvement in rolled steel wheels may be expected when the roads insist on wheels made of better steel and its alloys, and treated and hardened to increase the work that can be obtained. Experiments are now being made along this line. The work of our present steel wheel may be considerably raised if we give the same attention to lubricating the flanges that we now do to the bearings. This should be done and doubtless will be in the near future.

P. V. C. See, Akron, Ohio, expressed some skepticism in regard to the effect of the welding on the structure of the steel, fearing that it might cause some strain in the metal of a dangerous character, and for this reason he said he had tried welding on wheels used on safety cars, but had not dared to do it for high-speed interurban wheels. A very pertinent point made was that four steel wheels in use by the Northern Ohio Traction & Light Company have recently broken, the most recent case having caused a very serious accident. Had this wheel been one on which welding had been done the company would have been seriously pressed to prove that the breakage was not due to the welding, or that the company had exerted the utmost care to preserve safety.

G. H. Kelsay, Elyria, Ohio, concurred in the expressions of Mr. See. On the other hand, E. B. Gunn called attention to the fact that, according to his method, there remained § in. of stock of the old wheel in the flange on which the new metal is built up, which gives a good factor of safety. If the welding is properly done and is not spoiled by an effort to do it too quickly, he thought that there is no danger of strain in the metal. He emphasized that good, careful welding work in this connection is absolutely necessary.

Another equipment engineer brought out the fact that on his system, with an average of 365,000 car-miles per month, he had never had a wheel break with the 37-in. steel wheels used. He thought that the need for welding flanges could be largely overcome by careful inspection. His comment was that sharp flanges are the result either of soft flanges or of out-of-square trucks. If the metal is soft it ought not to be welded. If the tendency toward wearing sharp is due to the truck being slightly out of square, this can be corrected by some work on the truck or by reversing the pair of wheels. He also felt that if the wheels were turned a little earlier, as the flanges wore thin, instead of waiting until the limit of safety had been reached, it would not be necessary to turn away so much of the tread and the aggregate mileage during the life of the wheel would be increased and would largely offset the advantage that might be secured from welding. He has secured an average life on the wheels mentioned of 168,000 miles.

Terence Scullin, Cleveland, Ohio, was inclined to depreciate the cost figures given in the papers. He reiterated the thought made in Mr. Taylor's discussion that he believed heat-treated steel wheels could be produced at a small additional expense and that the mileage could thereby be doubled. He thought that there was no good reason why the same excellent results cannot be obtained from treated steel wheels that have been derived from the use of treated steel gears.

One of the delegates present brought out the fact that the Erie Railroad is welding passenger locomotive flanges extensively and sending them out rough without any machining. This is also the practice followed by M. M. Nash, Terre Haute, Ind., on the interurban cars of the Terre Haute division, Terre Haute, Indianapolis & Eastern Traction Company. In this welding work Mr. Nash does not have the wheels removed from the truck, the truck merely being rolled out from under the car for convenience in working. He has one pair of wheels that have gone 266,000 miles and as far as he could see, he said, they were good for that much more. The method of wheel welding followed by Mr. Nash was described in ELECTRIC RAILWAY JOURNAL for May 7, 1921, Volume 57, page 860.

A representative of one of the wheel manufacturers expressed the view that the welding of flanges was an unsafe practice because the sudden cooling which follows the fusion of the metals, due to abstraction of the heat by the surrounding steel, is almost the same as quenching, and therefore is very likely to set up unusual strains in the metal of the flange.

Chairman Seely summed up the discussion by saying that while there is much doubt on the part of many equipment engineers, it is nevertheless true that the practice of welding is being followed to the satisfaction of the officials of certain companies, and he thought they would not permit this to be done if they were not reasonably certain that it was safe. He commended the men who had the nerve to try out the practice.

Discussion on Current Collectors

J. F. Elward, master mechanic Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, in discussing the papers on the relative merits of the trolley shoe and the trolley wheel, said he had at one time had seventy-five shoes in use in city service and that they had been very satisfactory except for the inability to back up. Recently the Danville division of the T. H., I. & E. has been equipped with a new type of shoe made by the Automatic Sliding Trolley Company, Frankfort, Ind., having a wheel at the rear end of the shoe which comes in contact with the wire when the car backs up. Mr. Elward said that the operation of this shoe was good, but the maintenance high. He said that with the shoe, costing him $7.50, he had obtained 8,778 miles, or a cost per 1,000 miles of 85 cents. By way of comparison, he said that a trolley wheel costing $1.39 gave 4,064 miles, or a cost of 34 cents per 1,000 miles. He made the comment that if as much attention were given to perfecting trolley wheels as is being given to sliding contacts there would be much less trouble than there is with the wheels.

In regard to the building up of copper in the groove of trolley wheels, he said that an investigation to explain the cause of this had been made and it had developed that the trolley stand was worn, the harp loose and the pin worn, causing high resistance in the circuit. By putting a jumper around these parts, the trouble was eliminated.

Another master mechanic said he

had never had a trolley wheel build up. He had tried seven different kinds of trolley shoes and said that if it were not for the difficulty in backing up the Miller shoe would be a great success on high-speed lines where the current collected is large. He said that in order to average 3,000 miles on a trolley wheel, it is necessary to have the best wheel made and everything about the collecting mechanism just right.

W. McKay White, Goshen, Ind., pointed out that experience had shown that the sliding contact does not work as well on No. 00 wire, such as is used on some city systems, as it does on No. 000 and No. 0000 wire. In reply to a question about the use of shoes on city lines, he said that the shoe is being used with success by the Oakwood Street Railway, Dayton, Ohio, and by the city lines in Los Angeles, Cal. The use of the shoe on grooved wire somewhat approximates the pantagraph which is considered the best current collector. He said that one equipment man had found that if he tightened up the harp so that the wheel rolled hard, copper would be built up on the wheel; and then if the harp was loosened, the wheel would wear out. The large current collecting capacity of the shoe is its main virtue. He also pointed out that the trolley shoe has been far more successful on steel wire than the wheel.

Professor D. D. Ewing, Purdue University, presented some of the results of a study of the electrical and mechanical losses in current collecting devices which threw much light on the subject. The results of this study were given in an article which appeared in ELECTRIC RAILWAY JOURNAL for Oct. 23, 1920, volume 56, page 866. Professor Ewing also presented the results of further investigation on this subject, which appears elsewhere in this issue.

DISCUSSION ON PICK-UP AND DELIVERY SERVICE

In the discussion which followed the paper by Mr. Ackerman on pick-up and delivery service, it was brought out that the railway company, in conjunction with a trucking company in Cincinnati, maintains three rates: A straight class rate for the railway service only, a pick-up and delivery rate which includes both railway and trucking service, and a pick-up or delivery rate which covers the railway service and trucking at one end of the rail haul only. The pick-up and delivery service has added approximately 100 per cent to the standard railway rate. This makes a total rate practically equivalent to that for express. Any claims occurring, if the responsibility is concealed, are distributed 50 per cent to the railway and 50 per cent to the trucking company. If the responsibility can be fixed on either the railway or the trucking company the one involved pays the total claim. Mr. Ackerman said, however, that the claims involved have been reduced as compared to the former claims of the railway before the joint arrangement with the trucking company was entered into. Practically any class of freight will be handled, the only restriction being on live stock. In providing the pick-up or delivery service in the smaller cities reached by the traction lines, the cost is paid out of the railway revenue. This has been found necessary in order to meet the competition. The company in Cincinnati with which the traction company has this joint arrangement has a fleet of sixty-four trucks and it has been transformed from a competitor of the traction line in freight hauling to an ally.

Expresses Confidence in Future of Traction*

President Blinn in Address Before C.E.R.A. Speaks of Rates, Urges Financing by Customer Stock Sale and Points Out Feasibility of Using Motor Buses

BY A. C. BLINN
Vice-President and General Manager
Northern Ohio Traction & Light Company, Akron, Ohio

IN SELECTING Indianapolis for this meeting, the Central Electric Railway Association was prompted by a genuine desire to honor our distinguished co-worker who heads the American Electric Railway Association—Robert I. Todd. This is his home and from here he has performed gallant service to this great industry which we represent. Mr. Todd has long been a valued member of our organization. He was its president in 1920, and this association feels that it has been signally honored by his selection as president of the American Association where he will have the fullest opportunity to perform a great work for which he is so ably qualified.

I desire, upon this occasion, also, to publicly express my thanks for the cooperation and help of the executive committee and my fellow officers. To me they have given full measure of assistance.

During the year 1921 your association held one meeting in the latter part of June on the steamship South American, which was largely attended by the members, their families and friends. That meeting was a success in every particular, and the thanks of the association are due the hotel and arrangement committee, whose untiring efforts resulted in one of the most enjoyable summer meetings this association has ever held. Our members have little conception of the vast amount of work involved in arranging for that boat trip, and too much cannot be said in praise of those who had the matter in charge.

A careful review of the operating results obtained during the year just passed, brings to the mind of the busy operator few thoughts that are refreshing. In 1920 the electric railways entered the period of business depression in a miserable, half-starved condition, brought about, let us say, by a lack of understanding on the part of rate-regulating bodies concerning our real problems and the numerous difficulties with which our properties have been confronted for many years. The manner in which the managements are bringing the companies through this trying period insures for them the profound admiration of every business man in this country.

Rates have not been, and are not now, in any sense commensurate with the cost of conducting the business in a manner demanded by the public. In many cases, particularly where the control has rested with municipal authorities, rates have been changed simply as a matter of political expediency, little regard, if any, being given to the necessities of the situation.

During the period of the war operating costs were higher than had ever been experienced in our history, and when all other business was enjoying profits far beyond its fondest dreams, our railways were, in most instances, kept by rate-regulating bodies in a condition where they were compelled to serve the public at rates which were by no means adequate to meet all of the costs. The great outstanding feature of those times is the fact that the public was not required to pay proper rates at a time when it was well able to do so.

However, notwithstanding the great difficulties with which we have been confronted, the companies we represent are coming through this depression in a manner that must eventually gain for them the highest commendation on the part of the business world and of the public generally.

We are engaged in operating properties that are performing a great public service—a service that has become an absolute necessity to millions of people, a service that is a material factor in the successful growth of the territories in which our lines are located. Our properties have two important functions:

First, they must, in order to be successful, render service from day to day of the very highest character; second, and equally as important, their facilities must be extended from time to time as the public necessity requires.

If the utility is unable to grow with the community, the community must suffer because it cannot expand without transportation service. To perform either one, or both of these important duties, our corporations must have an income that will pay all operating costs, taxes and depreciation plus a reasonable return on the investment, with sufficient balance to create a surplus to meet unusual hazards—a sufficient balance to be called upon in times of great stress, a balance to tide the properties over in lean years.

Much has been said in the past with

*President's address to the annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

respect to educating the public to the necessity of higher rates. Much has been accomplished along this line, and at this critical period in our lives we must approach the future with renewed efforts towards building good will and educating the people generally on the question of income and outgo. Under present revenues the electric railways cannot properly serve the public year after year as the public is entitled to be served. Our service cannot be of the high type which is demanded, nor can the facilities be extended, unless the rate situation is materially improved.

The public must understand that these properties require large capital expenditures each year, and that capital cannot be forced into this or any business; it must come voluntarily from the investor and it will not come unless it is assured of a safe and regular return.

We must pay labor its wage, likewise we must pay the wage of capital. Like labor, if capital cannot earn it will not work. If this business is denied proper rates it cannot earn. The rate-regulating authorities in this country in numerous cases have recognized these fundamentals and have granted some measure of relief. On the other hand, there are many instances where such relief has been denied.

Where rates are fixed by politicians for political purposes there is but one relief and that is from the public itself. No effort should be spared to lay all the facts before the people. We should let no opportunity pass to drive home the argument that this business does not differ from any other business in that it cannot render good service from day to day without an income that will pay all the costs of operation, build a surplus, pay a reasonable return on the investment, and

Further, that our companies cannot bring the much needed new capital into the undertaking, extend their facilities from time to time, unless proper rates prevail.

Stock Sales to Customers Urged

Because of the difficulty in obtaining new money in the manner customary to this business, many public service corporations have undertaken to sell their securities in the communities where they operate. These efforts in many cases have met with wonderful success, and a most ideal condition is to have a large number of stockholders in the territory we serve.

I venture the assertion that the acquisition of an interest in the properties we represent by the customers of these properties will have a sobering influence upon radicalism. In my judgment where the savings of local citizens (customers) are invested in their utility the chances of fair treatment are multiplied and the likelihood of serious disputes reduced. It will be interesting to watch the course of proposed radical legislation in communities where the customer-ownership idea has gained considerable headway. If I look into the future aright, participation in our business through investment in our securities bodes ill to the demagogue whose success in the past has so often been based upon appeals to ignorance and indifference in districts holding false notions, or no ideas at all, about local utilities.

But securities cannot be sold in our several localities unless the purchaser can be assured beyond the question of all doubt that his dividends are going to be paid with regularity. He looks for that assurance when making an investment in business other than ours, and he has the right to expect it if he invests with us. Therefore, one of the great problems is to obtain an income that is fair to the stockholders, and fair to the users of the service.

Create a Feeling of Confidence

We must use every endeavor to create in the minds of our people a feeling of faith and confidence in our institutions. One great difficulty that has existed throughout this nation in the past is that the plant of "confidence" has not been nourished and has not grown as it should. It has suffered severely from the cyclone it has weathered. It is this restoration of confidence which we seek when we foster customer-ownership. If the users of our service have faith in our properties and in us, and we are allowed to earn on the dollars invested in the property, then we can expect our patrons to become partners in our business.

The company which I have the honor to represent has been selling its preferred stock in the territory in which it operates since July, 1921. Up to the present time it has sold approximately 6,000 shares to the users of its service. The money derived from the sale of its stock has been used only for capital expenditures, and this company will continue to do a large part of its financing in this manner because of the many benefits that can be derived thereby. I urgently recommend that the properties here represented thoroughly investigate this method of finance and put it into effect wherever it is possible for them to do so.

In my judgment customer-ownership will establish, beyond doubt, confidence which will have for its just reward the development so sorely needed, to the end that the wheels of progress may once again grind out their daily grist. It is only natural that the people we serve should be our stockholders. Ours is a business they can see every day, one in which they should have confidence and one which will pay them substantial returns on their investment if that investment is properly treated. It is not sufficient merely to offer our securities for sale. They must be offered in small enough denominations, or on the easy-payment plan, so that all can buy. They must be made readily available across a counter, like bread and bacon in a grocery store.

I desire at this time to direct your attention to the development now taking place in bus operation as a means of city and interurban transportation. In my opinion buses will never replace street cars in the large cities of this country. I do believe, however, that we are approaching the time when the growing use of the automobile is going to seriously tax the capacity of our streets and it must follow that urban transportation will be taken care of in a manner calling for the smallest number of units.

The latest type of city motor car and trailer will carry from 175 to 200 persons. To haul the same number with buses would require approximately eight vehicles. It will be seen, therefore, that one street car unit carrying approximately 200 persons during the rush hours, when the capacity of the streets is taxed to the utmost, must survive as against eight motor buses giving the same service. There is a field, however, in which motor transportation can function. I refer to densely populated, outlying districts, not now served by transportation lines which can be found in almost any up-to-date city. These territories can be admirably served for the time being by motor buses, either as extensions to existing railway lines, or buses may be operated advantageously as one line of a railway transportation system. The growing interest on the part of the public in bus transportation calls for a close study of the subject by every railway manager. If the people desire and demand bus transportation, our companies should be the ones to furnish it because we are primarily in the transportation business. The methods are of little consequence.

In conclusion, permit me to look for a moment into the future. Sooner or later business must improve. It is almost impossible to believe that it can become more stagnant and, having weathered the storm so nobly, our properties can look forward with encouragement to the business revival that certainly must come. When the tide will turn no man can tell. We will continue the rigid economies now in effect; we will not be led astray by the cheap optimism that is abroad on every side; we will go on with courage; we will continue to serve; we will do our best, and finally, we will win because we only ask that ordinary justice be given us.

Annual Report of the Secretary and Treasurer

L. E. Earlywine, secretary and treasurer of the association, in presenting his report, referred to the accomplishments of the last twelve months as representing a real advance in the association's activities. He laid particular stress upon the committee work, showing that the new system of executive committee meetings has resulted in better management of the association. He also paid special attention to the organization of the Engineering Council outlined previously in these columns. He quoted one member of the Council as remarking "there are some bouquets, also some

bricks, thrown during the meetings, but the purpose of the council is to arrive at the unvarnished truth."

The year 1921 closed with a membership of sixty-four interurban lines, five city lines and three lake steamer lines. The total interurban mileage represented was 5,273.6. This membership represents a decrease of one interurban line and an increase of one city line over the record of the preceding year.

In reporting on the activities of the Central Electric Railway Accountants Association, Mr. Earlywine pointed out that its principal attention had been toward the adoption and use of standard forms, such as astray freight bill, interline way bill, etc.

In reporting on the activities of the Central Electric Railway Traffic Association, he said that it had done a great deal toward the revision of all association joint tariffs, all having been completed with the exception of two during the year. Among the freight tariffs reissued were the equipment records, storage tariff, and exceptions to official classification. Passenger tariffs reissued are tariffs covering movement of special baggage cars, party-fare tariff, 2,000-penny coupon ticket tariff, intrastate passenger tariff in Indiana, joint interstate passenger tariff, as well as the joint local baggage tariff.

Under the auspices of the association, the official interurban map has been revised and new plates made.

He called attention to the particular activities of the committee on prevention of freight claims in its efforts to avoid having steam lines "dump" second-hand containers on the electric lines.

Another committee becoming active is that on motor bus and motor truck competition. This committee, Mr. Earlywine pointed out, is not throwing stones at motor competition, but works on the idea that while the motor bus is here to stay, there is a certain defined place for it and it should be the duty of all transportation officials to see that it is held to its place.

In closing Mr. Earlywine placed emphasis on the attitude of the public which likes to consider electric carriers —interurban lines—as one line in dealing on through transportation questions whether passenger or freight. He recommended that the association continue to work to iron out all difficulties of interline co-operation.

Light Interurban Cars Save $47,000 Annually*

Better, Safer Service Given on N. O. T. & L. Line with 42,000 Lb. Cars—How These Cars Effect a Saving Amounting to Over 19 per Cent on the Investment Is Interestingly Analyzed

BY PIERRE V. C. SEE
Superintendent of Equipment Northern Ohio Traction & Light Company, Akron, Ohio

AN UNCLE of mine in the Tennessee Mountains had for his favorite saying the phrase, "It stands to reason," in discussing the economy of converting corn he raised into a compact fluid. He held it to be more economical to invest in a small barrel then in a big corn crib, the maintenance on the barrel being considerably less than on the crib over a period of years, to say nothing of the lesser original investment and the revenue produced.

It "stands to reason" that a compact, light-weight, steel electric street or interurban car is more economical to operate than a heavy wooden or steel car, but the questions in the mind of most electric railway managers are:

Will the light-weight car give the satisfaction for interurban service that the heavy type has given over a period of years? Will the cost of maintenance be less? Will there be a real saving in dollars on the investment, a saving in energy, a saving on the roadway? Will the lighter car meet with public approval for interurban service?

These are questions of vital importance to railway operators, and these are the questions I shall endeavor to answer—not by saying that "it stands to reason" the saving is there, but to submit to you plain figures based upon one year's operation of the light-weight interurban car on the Akron-Kent-Ravenna division of the Northern Ohio Traction & Light Company's interurban system. It may be added that subsequently other cars of this type were placed in service between North Canton, Canton and Massillon.

Electric railway men throughout the world have recognized, during the last few years of rising costs, the necessity for more economical operation if the electric railways were to develop properly to meet the public needs. It was not strictly from the viewpoint of economy, however, that the Northern Ohio Traction & Light Company put into use the lighter type of interurban cars, but rather from a desire to better the service and add to the safety of operation.

In 1919, travel became exceptionally heavy on this division of the system, due to the establishment of new industries and to park travel. The towns reached by the line are Kent and Ravenna, the latter being the eastern terminal, and both having a population exceeding 7,000. A summer resort between the two places, known as Brady Lake, brings a heavy summer traffic. The line runs through the principal street of Cuyahoga Falls, a city of 10,000, joining Akron on the northeast. The territory along the line is closely built up, so that more than half of it is city streets and suburban districts where high-speed running is not permissible. The line is 18.6 miles of single track and it has numerous heavy grades and curves. There is one 12 per cent grade about 2,200 ft. long and many 4 and 5 per cent grades over the rolling profile.

The company in 1919 was operating a wooden type car weighing 62,000 lb. equipped with quadruple G.E.-57 motors and K-34D control. The motors had a high-speed gear ratio. The frequent stops and the heavy grades and curves brought high maintenance on the electrical equipment. It was necessary also to operate each car independently, running the trains in sections, for the reason that these cars were not equipped with multiple-unit control.

Investigation relative to multiple control led to inquiry concerning a lighter type of car. The advantages of a lighter car, geared for a lower balancing speed, were immediately recognized with the result that lighter center-entrance cars of the Peter Witt type were ordered for the line in the spring of 1920. Delivery was made in October and on Nov. 1, 1920, the old cars were replaced by Peter Witt cars having 26-in. wheels, weighing 41,900 lb. and having a seating capacity of fifty-four passengers. The cars were equipped with quadruple Westinghouse 532-A motors of 50 hp. each and H.L. control arranged for multiple-unit train operation. The heavy grades prevent the use of trailers. The motors were geared for a balancing speed of approximately 32 m.p.h. at 600 volts. A detailed comparison between the old and the new cars follows:

	Old Type Car	New Lightweight Peter Witt Car
Weight, pounds	62,000	41,900
Length	45 ft. 3 in.	50 ft. 3 in.
Height of floor above rail	50 in.	36 in.
Seating capacity	46	54
Motor equipment	4 G. E. 57	4 W.H.532-A
Motor, horsepower	50 at 500 v.	50 at 600 v.
Gear ratio	24–63	16–56
Size of wheel	36 in.	26 in.
Free running speed, at 600 volts	40 m.p.h.	32 m.p.h.
Kilowatt-hours per car-mile at car	3.26	1.80
Kilowatt-hours per car-mile, at d.c. bus	3.95	1.97
Maximum current from trolley	540 amp.	340 amp.

It will be noted that the new cars weigh only two-thirds as much as the old cars, yet are longer and have a greater seating capacity. The light rattan seats do not give quite the comfort of the heavily padded plush seats, but no complaints have been received because of this. The reduction in the wheel diameter from 36-in. to 26-in., taken in conjunction with the correspondingly smaller bolsters and trucks, results in a difference in height of car floors of 14 in. This materially facilitates passenger loading. A further saving in the length of time required for stops is made possible by the center entrance, in that passengers may load and unload at the same time. The control is interlocked with the doors. Door signals only are used in starting trains.

*Paper presented before Central Electric Railway Association annual convention at Indianapolis, Ind., Jan. 26, 1922.

It may also be noted in this connection that the smoking compartment was abolished. This change not only caused no complaint, but rather a favorable public opinion, the ventilation being greatly improved. The lower steps, and the general step arrangement, decreased step accidents to the minimum. In fact, a step accident has been rare on this line since the change was made. The saving from this safety standpoint can hardly be estimated, but let's see where there have been savings which were easily determined.

Energy Saving Proves to Be an Important Item

The maximum power demand of the old cars was approximately 325 kw., while that of the lighter cars is only 204 kw., at 600 volts. The peak demand on substations has been reduced accordingly. It will readily be understood that this is due to the weight, gear ratio and the type of motor on the new cars.

The energy consumption of the old cars was 3.95 kw.-hr. per car-mile while that of the new cars is 1.97 kw.-hr. per car-mile, measured at the d.c. substation bus.

Mechanical as Well as Electrical Maintenance Reduced

So much for the energy consumption. Almost everybody felt that it "stood to reason" the energy consumption would be considerably less. But what of the maintenance? Note this comparison; From Nov. 1, 1920, to Nov. 1, 1921, only one armature was rewound and one repaired on the lighter cars at a total cost of less than $100, while the armature repairs alone on the motors of the old cars from Nov. 1, 1919, to Nov. 1, 1920, was $11,000! This heavy maintenance was due to the extreme grades and high gear ratio of the old cars. Of course, the motors on the old cars were not new motors but every shop man knows that the age of a motor does not materially affect this type of repairs. Here was a saving of $10,900 in twelve months, which amounts to almost a thousand dollars a month.

But that is not all. The lighter trucks and car bodies are more easily repaired, and repairs are made at a lower cost. For example: A gang of three men was required for work on the trucks of the old cars while it has been found that the same class of work on the new cars can be done easily by two men. The old maintenance for 1919-1920 was 5.28 cents per car-mile. This figure corrected for a reduction of 25 per cent made in wages brings 4.62 cents per mile for the old cars under present working conditions. For the new cars with approximately a 35 per cent reduction in weight, the maintenance was 3.21 cents per car-mile, or a saving of 1.41 cents per car-mile. Multiplying this by the Akron-Kent-Ravenna car mileage of 625.539, makes an annual saving on mechanical maintenance of $8,758. To this is added the known saving of $10,900 for armature repairs, giving a total of $19,658 maintenance saving in excess of the energy saving. But even that is not all. The cost of repair parts is considerably lower when it is necessary to purchase repair parts.

Let us go a little farther. The old cars were equipped, as previously noted, with K-34D control and, of course, operated in single car trains. As stated in the beginning, one of the chief reasons for the company deciding to go to the multiple-unit control was to provide increased service and at the same time get away from single-car train operation, and, therefore, make for the safety of the passenger. For in so doing the danger of rear-end collisions (and every operating man realizes the gravity of running trains in sections on a single-track road) was practically eliminated. The new cars with multiple-unit control are operated in two-car trains continuously during the rush hours, and at all times during the summer months to the Brady Lake summer resort. Only three platform men are required on a two-car multiple-unit train instead of the four men required when the old cars ran singly in two sections. This operation effected a saving of 112 man-hours per week during the 17 weeks of the summer and an average of eighty-four man-hours per week during the thirty-five weeks of operation on the winter schedule. As the average rate of pay is 50 cents per hour, the annual reduction in platform expense is $2,422. This two-car train operation also reduces street congestion, which you may readily see also reduces the accident hazard.

THESE CARS ARE THE MONEY-SAVERS

Various Roadway Savings Have Been Made

And then there is the maintenance of roadway. We have no absolute figures showing actual comparison. It would be unfair to take figures on the cost of maintenance for the last twelve months and compare those figures with the figures of the preceding twelve months, for entering into the savings that have been made are the reductions in material costs, labor and other items. A separate accounting of the material and labor used on this particular division has not been kept, but the maintenance of roadbed has been greatly less during the last year. Assuming that rail cost $6,000 per mile and will last ten years under the operation of the 62,000 lb. car, all conditions being equal, the rail on which the 42,000-lb. car is operated should last proportionately longer. Experiments on the strength of steel have proven that steel will break more easily under much fewer heavy blows than a large number of light blows. Upon this basis, our engineering department has figured the saving in the wear and tear of rail alone at approximately $250 per mile. per year.

Concerning ties, the average maximum life of a good grade of tie is approximately nine years. In other words, a tie will decay during that period to a condition where it is of no value. In the running of heavy cars, the rail will wear itself into the tie, thereby considerably shortening the life of the tie as compared to the life of the tie over which the lighter cars are operated. How much this amounts to is difficult to figure accurately, but it is safe to assert that the ties over which lighter cars are run will last at least one year longer. This being true, the average renewal per year under heavy traffic would be 300 ties per mile. Under the lighter traffic it is but 270 ties per mile, making a net annual saving of 30 ties per mile. At an average price of $1.30 each, this amounts to $39 per mile per year.

There is also a considerable saving in the reballasting of roadbed. What this amounts to, so far as our experiments go, is but an estimate, but our engineers are a unit in declaring that the saving is easily 10 per cent per year. Track and roadbed, labor and ballasting material costs have been approximately $750 per mile, and upon that basis the 10 per cent saving amounts to $75 per mile. The apparent saving is, therefore, to be summed up as follows: Rail, $250; ties, $39; maintenance of roadbed, $75; total, $364 per mile, or more than $6,700 annually for

the roadway of the entire line. Summarized, the savings are as follows:

ANNUAL SAVING OF OPERATING EXPENSES	
Energy consumption	$18,578
Maintenance of car equipment	19,658
Maintenance of roadway	6,770
Reduction crew expense by train operation	2,422
Total annual saving	$47,428
INVESTMENT	
Purchase price of 15 new cars at $15,109 each	$226,635
Return on the investment by savings	19.36 per cent

In addition to these, there were other savings which are difficult to evaluate. With the old cars, pull-ins were frequent and many regular trips were lost with consequent reductions in income. The new cars have been giving excellent service. In view of the competition of a motor bus which parallels the line the entire distance, there can be no question but the irregular service that certainly would have existed through the continuation of the old cars would have diverted much traffic to the bus line.

It became necessary after the cars were in operation a few weeks to lengthen the running time five minutes, but this in no way affected service. It merely reduced the layover at the end of the line. Today we are maintaining, satisfactorily, a thirty-minute headway without a single material complaint.

We have bettered the service by means of the two-car trains; we have eliminated the accident hazard; the cost of energy has been greatly cut down; less men are required for operation; a big saving made in car maintenance; a reduction found in the roadway upkeep; and the Akron-Kent-Ravenna line is really the only line of the system on which the earnings have maintained a straight line across the chasm of business depression that has swept Northern Ohio during the last eighteen months.

Three Years Experience in Welding Worn Flanges*

Results Obtained Have Been Very Satisfactory — Wheel Mileage Has Been Increased Greatly at Small Cost and With No Bad Results From a Safety Standpoint

BY E. B. GUNN
Superintendent of Transportation and Equipment
Western Ohio Railway, Wapakoneta, Ohio

OUR practice of building up worn flanges of steel wheels has now been in use for three years. During this period we have repaired flanges on more than 160 pairs of wheels with very satisfactory results except for three wheels referred to in a paper which I presented at the C. E. R. A. summer meeting in 1920. (See ELECTRIC RAILWAY JOURNAL, July 17, 1920, page 129.)

The method used by our company has not been changed since we started, except that we try to do better and neater work. We have been fortunate in keeping the same operator that we had at the start and I feel that a good operator is most necessary for insuring good work, although the welding equipment used must be of a type to insure proper regulation.

We have used the same welding machine for more than three years, and this machine has been in constant service not only in welding wheels but for maintaining the bonding of our 120-mile line, and such other shop work as we have, as well as for doing a good deal of outside welding work. Proper control of the arc is very important in the welding of worn flanges. If the arc is too intense, overheating of the steel in the structure of the wheel might injure it; or if the arc is too short the proper amalgamation is not obtained and shelling results. for the metal in that case is simply laid on the steel structure and is not properly amalgamated.

A good average record is that for a pair of wheels placed on passenger car No. 18 in September, 1918. These wheels were 36 in. diameter, rolled steel and manufactured by the Carnegie Steel Company, Cleveland, Ohio. The car was operated 65,667.9 miles before the wheels were taken out for sharp flanges. These wheels were welded, turned and put back under the car, and made 57,591.3 miles, after which they were again taken out for worn flanges. After again being welded, turned and put back they made 44,025 miles, and apparently these wheels will be good for 15,000 miles more before they are taken out. There is stock enough in the wheels again to weld and turn them, and they should make a total of 242,284 miles. These wheels will be welded and turned and will be installed under a freight trailer, and be used in that service for several years. Before using the welding process our wheel mileage did not average more than 140,000 to 150,000 miles, and then the wheels would have to be scrapped, for they could not be turned for our freight trailer service as they did not have enough stock. The only repairs necessary before they are put into trailer service, is to shape the flange, weld and turn them and pair them up with other worn-out wheels as to size.

The expense of welding the wheels mentioned was, approximately:

50 lb. welding metal at 8 cents per pound	$12.00
130 hours welding operator labor at 60 cents	18.00
150 kw.-hr. at 2½ cents	3.75
10 hours machinist labor at 60 cents	6.00
	$39 75

This would take care of the extra work involved in welding the wheels and turning the flanges after welding, over the cost of simply turning the wheels if no welding was done. This makes a cost of $4.97 per wheel, or $9.94 per pair. This is not quite 17 cents per 1,000 miles for welding, on the basis of 60,000 miles additional wear.

One of the chief things that the operator must avoid in welding flanges is fast and too steady work as these have a tendency to overheat the metal in the wheel and to cause trouble with the structure of the steel.

So far we have had no broken or cracked flanges on any wheels that we have welded, and we have been using these wheels on all classes of our passenger cars. We also have been doing this work for the Dayton & Troy Electric Railway, the Dayton & Western Traction Company, and the Tiffin, Fostoria & Eastern Traction Company.

I feel that it has gone beyond the experimental stage, and that there is no question of the advisability of doing this work in any shop, either from the standpoint of safety or of economy. We feel that our company has saved more money from the system of welding flanges than from any other one economy introduced within three years.

*Paper presented before annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

How Flanges Are Welded on Winona Interurban*

BY CHARLES SIGLER
Master Mechanic Winona Interurban Railway, Warsaw, Ind.

NO MECHANICAL operation has been passed upon with more varied opinions than the proposition of building up or filling flanges on steel car wheels. In contemplating the work, none have cared to make any sacrifice of safety for economy. There are no text books today which give us any data or recommendations on this subject; neither do the manufacturers of the various welding equipments, nor the manufacturers of welding steels make any guarantee on this particular class of welding, and there are no wheel manufacturers who recommend or approve of flange welding.

About four years ago the writer made his first attempt of applying metal by electric welding to steel wheel flanges. These wheels were used under a low-speed heavy freight motor car. For some time the performance was watched very closely, not from a standpoint of economy, but of safety. As time went on the results were gratifying with regard to both economy and safety. Eliminating details of any of the experiments, none of which ever gave any trouble, but which led up to our present method of filling in flanges on steel wheels, I will try to give a brief explanation as to how the work is done, its cost and the results derived therefrom.

*Paper presented before annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

Most all steel wheels are taken out of service on account of sharp flanges, and in nearly every case there will be one sharp flange on each axle while the other will have become much larger than the original.

In preparing wheels for electric welding or filling, the wheel with the worn flange is turned, taking ¼ in. of metal off the tread and in doing so ¼ in. of new flange at the base. The top of the flange is finished to proper contour, which leaves a right-angle groove in the flange about ⅝ in. deep, and parallel with the tread and ½ in. deep at right angles to the tread for a 1 in. flange. The other wheel is turned to the proper diameter and a new flange formed. If both flanges are sharp, the same preparation is made for filling both flanges.

In filling the flange the axle is placed on end, one wheel resting on the floor. This method brings the work to a convenient height for the operator. A ¼-in. welding rod has been found best suited for this work. The welder completes a flange in one hour and forty-five minutes, using 7¼ lb. of welding steel and 120 kw-hr. The total cost per flange is as follows:

Welder's time—1 hour 45 minutes at 50 cents.	$0.88
Steel—7¼ lb. at 25 cents	1.82
Current—120 kw.-hr. at 1½ cents	1.80
Total	$4.50

These figures are based on actual experience, and on this basis I will try to show that filling flanges with electric weld is worth while.

About 55,000 miles is a fair average between turnings on 37-in. steel wheels and during this service the tread wears ¼ in. Then we get about 13,750 miles for each 1/32 in. of tread wear. In order to make the wheel suitable for service again, using the filled flange, ¼ in. additional metal must be removed from the tread to properly shape the flange for filling. This brings the mileage down to approximately 6,875 miles per 1/32 in. or 55,000 miles per ½ in. of tread worn and turned off.

Not using the electrically-filled flange, the first results would remain the same, that is: 55,000 miles with ¼ in. of tread wear. In order to form an entirely new flange, it is necessary to remove about ⅝ in. of metal from the tread, making a total of 1 in., with a mileage of 3,437 per 1/32 in. of tread metal worn and turned off.

The mileage per 1/32 in. of wear, no doubt, will not hold good throughout the life of a wheel. Nevertheless, the ratio of 1/32 in. of tread wear between wheels with filled flanges and turned flanges will remain the same. Experience has proved that a filled flange will last as long as a turned flange, a fact which makes it possible to double the life of a steel wheel with an additional cost of $15 for filling flanges four times.

Considering past experience, I do not hesitate to recommend both from a standpoint of safety and economy the practice of filling flanges on steel car wheels with an electric welder.

Contact Shoe vs. Trolley Wheel*

The Relative Merits of the Sliding Contact Shoe as Compared with the Standard Trolley Wheel Are Discussed

By H. Savage
Assistant to Master Mechanic (Detroit) United Railway

I DO NOT know of any railway that has tried the sliding contact shoe in city and light suburban service, nor do I think there is any necessity for abandoning trolley wheels for slides of present design. The standard trolley wheel has ample capacity to transmit the current required for equipment in this service, and the speed is not high enough to cause them to leave the wire, but in high-speed and heavy low-speed interurban service it is universally known that the trolley wheel never was satisfactory. While there have been many changes in the design of trolley wheels to meet local conditions, the two principal points of objection to the wheel still remain, that is, lack of contact surface on the wire, and the frequency of the wheel leaving the wire in high-speed service.

I have seen many trolley wheels that have increased in weight from 2 to 4 ounces in approximately 100 miles run. This is caused by copper from the trolley wire being deposited in the groove of the wheel. This, to my mind, is very injurious to the trolley wire and leaves the surface very uneven. This increases the size of the arc between the wheel and wire, which is quite general with heavy high-speed equipment. If steel trolley wire is used the arcing is very pronounced under most favorable conditions.

Observation on Two Lines Using Different Wheels

My observation for a period of about three months of two lines having approximately the same mileage and class of service may be of interest. One line uses the standard trolley wheel, and the other the sliding contact shoe. On the line operating with trolley wheels, the overhead equipment was damaged by the trolley leaving the wire twenty-seven times, and a total of 3,200 ft. of wire was torn down. I am unable to state the damage done to crossarms, span wires and trolley hangers. The following car equipment was used: Trolley poles, fifty-seven; trolley rope, 2,400 ft.; trolley wheels, two hundred and fifty; trolley retrievers, twenty-two. And there was a total delay to service of nineteen and three-quarter hours.

On the line using slides there were seven trolley poles, 280 ft. of trolley rope, three trolley retrievers, and eighty-two sliding contact shoes used. There was no damage to overhead equipment, other than that caused by wear, and no delays to service.

I do not know of any person in possession of information that will show the cost of replacing overhead equipment caused by the wear from sliding contact shoes. From my experience the wear on overhead equipment caused by the use of the sliding contact shoe is slight. An examination of trolley wire where contact shoes had been used continuously for the past twenty-three months showed that the wear on one-way wire is very slight, the wire having a brownish color, slightly glazed, while on wire in two-way operation the wear is more noticeable, but not excessive. The brownish color, and glaze do not appear on this wire.

In comparing the merits of the two devices the sliding contact shoe overcomes all the objectionable points of the trolley wheel. It is also known from numerous tests that the sliding contact shoe has about two and one-half times the life of the standard trolley wheel. If we take into consideration all the damage caused by the trolley wheel as compared with the wear on overhead equipment caused by the sliding contact, I am satisfied that the sliding contact is by far the more economical device to use.

After numerous tests we have found that the forged steel slide has the longest life, and causes the least wear on trolley wire. We also found that on wire where wheels and slides are both used the wear is much more noticeable than if slides or wheels alone were used. This is also true for a short time after trolley wheels are replaced by slides.

It is my opinion that the slides have not reached the point of perfection that they will in the near future. Changes will be brought about which will reduce the initial cost of the slide and also reduce the liability of wear on overhead equipment, which to my mind is greatly exaggerated at the present time.

*Paper presented before the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

Sliding Shoe a Better Collector*

By C. M. Bange
Master Mechanic Interstate Public Service Company, Scottsburg, Ind.

MY PAST experience with the sliding contact shoe has consisted merely of several tests to determine if a saving could be made by its use, which test at that time did not make the showing expected. Since coming to the Interstate Public Service Company, I find the sliding contact shoe filling the place of the trolley wheel where the current carrying capacity is the prime factor required. This the sliding shoe successfully performs while the trolley wheel proves a failure.

When under headway our limited cars draw approximately 400 amp. and

*Abstract of discussion on "Merits of Sliding Contact Shoe" at the annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

from 900 to 1,200 amp. when starting. It was found that under these conditions a standard 6-in. trolley wheel would build up in the groove instead of wearing away. Different tensions from 30 to 35 lb. were tried out but the wheel would collect copper from the line to a depth of about $\frac{5}{16}$ in. in 300 to 400 miles. Difficulty in keeping the wheel on the wire was also experienced. The schedule speed is 33 m.p.h. and the running speed at times reaches 60 m.p.h. or better. A wheel running under these conditions very soon becomes out of true and causes the drumming noise with which all are familiar.

The sliding contact shoe overcame all these objections; arcing at the wire is hardly noticeable even on a dark night; speed has very little effect on its sticking to the wire and its operation is not noticeable from the interior of the car. The one real objection is in backing up, for then it is necessary to have some one at the rope, especially when the shoe has worn in grooves.

Whether a lower tension than 25 lb. would still further improve its service I am unable to say, for that is the lowest tension obtainable on the trolley stand in use.

Opportunity for Improvement

There are several shoes on the market which manufacturers claim will back up as perfectly as go ahead, but on those I have tested there is still opportunity for great improvement.

From a mechanical and electrical standpoint the sliding contact shoe seems most nearly perfect. When new, most of the shoes that have come under my observation, afford approximately $\frac{1}{2}$ in. of contact with the wire, and after a few hundred miles of operation this is increased to 1 in. and more until worn out. As the shoe does not revolve, it is possible to connect it directly to the harp with a shunt, thereby eliminating all pin and bearing trouble. There are also fewer parts to maintain. And careful inspection of the trolley wire has shown no undue wear from the use of shoes.

The trolley wheel has been developed to a high point of perfection and where the current demand is not excessive, nor the speed too high, it will develop splendid mileage. But care must be observed to insure proper lubrication, and the contact springs must be properly fitted and inspected or the wheel will give out at the hub even before the groove has worn to the scraping stage. When new, only about $\frac{1}{8}$ in. bears directly on the wire and this will not materially increase as is the case with the sliding contact shoe. If a wheel is even slightly out of true, or balance, speed enters seriously into its current collecting properties.

The sliding contact shoes used on our cars equipped with four 150-hp. motors have averaged 2,400 miles. With the standard trolley wheel operating on cars equipped with four 75-hp. motors the average has been 2,800 miles, while on those cars equipped with four 50-hp. motors, the shoes have made approximately 3,000 miles.

A Scientific Study of Trolley Wheel and Shoe Losses*

By D. D. Ewing
Professor of Electric Railway Engineering
Purdue University, Lafayette, Ind.

IN ANY comparison of the relative merits of different types of contact devices we must keep clearly in view the practical requirements which a successful contact device must fulfill. In brief these requirements are as follows:

1. It should stay in intimate contact with the trolley wire regardless of the wire position either in a lateral or vertical direction, and regardless of the wire condition, new or worn, clean or fouled. Also it must "stay put" at low speed and at high speed, moving forward or backward.

2. It should not cause excessive wear of the contact line.

3. It should be able to collect without damage to itself or the contact line currents ranging from 50 to 1,500 amp. at low speed and from 150 to 300 amp. at 60 or 70 m.p.h.

4. It should be cheap both in first cost and maintenance and it should be readily replaceable. Also it should have long life.

As some of these requirements are incompatible, the actual device must necessarily be a compromise.

The operating, equipment and power departments of the railway, all are interested in the contact device. The operating department is responsible in a large measure for the trains or cars being on time. From the point of view of this department the device must be one which will stay on the wire under all conditions of service. It should not be necessary to make stops to replace the trolley, and trainmen have a natural and well-founded objection to clambering up on top of the car in foul weather. The equipment department is interested in the first cost, maintainence and replacement of the device and also objects to having trolley poles bent and trolley bases loosened or torn away. The power department also scrutinizes the trolley wire for wear and objects to having a trolley pole running amuck in the overhead system.

To merit commercial success the contact device must meet the just requirements of all three of these departments and the best test is the test imposed by every-day service on the cars. As regards the life of the device and the wire with which it makes contact, laboratory tests are of some value in indicating factors which affect life. During the past ten or fifteen years we have made a number of tests on trolley contact devices at Purdue University. The results of one series of tests is illustrated by the data given in Table I for a 6-in. U-groove wheel collecting 100 amp. trolley tension of 30 lb. They are approximate averages as read from graphs plotted from the test data. The friction loss includes both the trolley wheel bearing loss and the wheel-to-wire contact loss. It will be noted that the electrical loss at the contact is greater than the mechanical loss.

TABLE I—TROLLEY CONTACT DATA

Speed	Electrical Losses: Wheel-Wire Contact	Electrical Losses: Bushing Contact	Mechanical Losses Friction
10 m.p.h.	10 watts	13 watts	20 watts
15 m.p.h.	50 watts	17 watts	26 watts
20 m.p.h.	80 watts	40 watts	36 watts
25 m.p.h.	125 watts	80 watts	50 watts

With a car running at 60 m.p.h. a 6-in. trolley wheel will run at a speed of approximately 3,360 r.p.m. provided there is no slippage between wheel and wire. There is undoubtedly some slippage. We would expect the slippage to be more or less dependent on the relative frictional losses at the bearing and at wheel contact. A number of different investigators have attempted to measure the slippage but the results secured have not been very satisfactory because the device for measuring slippage affects the quantity being measured.

Several years ago we made tests on a number of interurban cars in order to determine the loss at the contact. We found that at speeds between 35 and 45 m.p.h. with a 6-in. wheel collecting 200 amp., the loss ranged from 400 watts for smooth running to momentary values of 15 kw. for occasional arcs at trolley hangers and rough spots on the trolley wire.

Later we made a number of tests with both wheels and shoe, measuring the voltage drop at the contact with a graphic recording voltmeter. We found that the chart of the meter was a true record of the rough spots on the wire, each rough spot being indicated by a "throw" of the meter pen. At higher speeds the "throws" were large in magnitude and numerous. Summarized, other results of these tests were as follows:

1. The graphic meter record shows increased voltage drops at practically every hanger.

2. There was far less arcing with the sliding shoe than with the wheel trolleys.

3. The power loss at the contact for smooth running was practically the same for all devices.

4. The ability of the shoe to stay on the wire was largely dependent on the angle between the trolley pole and the wire. At an angle of approximately 20 deg. the shoe was as satisfactory in backing as the wheel. With larger angles, such as 45 deg. the shoe was not very satisfactory when backing.

5. In general the shoe ran quieter than the wheels and the irritating vibration from the trolley base which so often manifests itself when the car is running at a greater speed than 35 or 40 m.p.h. was not as great with the shoe as with the wheels.

It may be said that the loss at the wheel-to-wire contact is not in itself important. Its importance lies in the fact that the wear on a part is largely a function of the energy expended on the part. The arcing causes pits or rough spots on both the contact device and the wire and these rough spots in turn promote wear by abrasion. Even

*Abstract of discussion on "Merits of Sliding Contact Shoes" at the annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

when the wire is smooth and no arcing occurs the electrical loss causes highly localized heating and this in turn causes tiny pits and thus roughens the surfaces in contact. It is possible that wear might be reduced somewhat by the use of a proper lubricant properly applied to the contact surfaces.

Sliding Contact Superior on Interurbans*

By J. W. Osborne
Superintendent of Equipment Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

THE interest shown in the sliding contact shoe is evidence in itself that the trolley wheel is not satisfactory for interurban service at least, and that a better trolley device would be welcomed. For interurban service I believe that most of us consider a sliding contact far superior to a wheel, but that the shoes have not yet been perfected.

For high-speed, heavy interurban service, for motor car trains with only one trolley pole up, and for electric locomotives some form of sliding contact shoe becomes almost a necessary as shown by the experience of such roads as the North Shore Line and the Interstate Line.

Many object to the use of the slide because they think it does more damage to the wire than is done by the wheel. In this connection I have been told that some have observed that on grooved trolley wire presenting a smooth running surface the wear caused by the slide is not as great as from the wheel, but that on round wire the slide soon wears away the edges of the ears and lets the trolley drop. It seems to be a question not yet decided whether the wheel with its poor contact and severe arcing is not more destructive to the trolley wire than the slide with its reduced tension against the wire, good contact and practically no arcing.

In testing the slide the rest of the trolley apparatus should be given careful attention. The slide can be operated with much less pressure against the wire than the wheel, due to its smooth sliding contact as compared to the rolling, jumpy contact of the wheel. This lessened pressure between the shoe and the wire should materially reduce the wear on both. A new type trolley base with approximately uniform tension for all heights of wire will undoubtedly give better results than the old type base in which the tension is reduced as the pole rises. I think a long, flexible trolley pole will give better results than a short, stiff one.

In regard to the performance of the sliding shoe as compared with the wheel, my experience has been that it rides the wire much better, does away with the objectionable noise and vibration so common with the wheel, cuts through sleet better, and gives greater mileage. In fact, the shoe does better than the wheel in every way except in backing up; and with so many working to improve the slide I think it will be but a short time until some design is perfected that will not have this defect. We are now trying out a slide fitted with a small wheel at the back which does permit of backing up without having some one at the rope. All the motor cars, about twenty-five in number on one division have been fitted with these slides, but we have not conducted the test long enough to make a report except to say that one of these slides ran thirty-four days for a total of 8,773 miles.

I am of the opinion that in the near future some form of sliding contact shoe will be developed that will replace the wheel for interurban service.

*Abstract of discussion on "Merits of Sliding Contact Shoe" at the annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

Reclaiming Joints in Indianapolis*

Results Obtained and Costs of Reclaiming Track in Paved Streets with Three Types of Welding—How Rebuilding Has Been Deferred

By T. H. David
Principal Assistant Engineer, Indianapolis (Ind.) Street Railway

EXCEPT for a few locations, the track in Indianapolis was largely reconstructed during the reorganization period from 1899 to 1902. A very large amount of this reconstruction became necessary because of the increase in weights of city cars and the advent of the heavier type of interurban cars which operate over the city tracks. Indianapolis has a total of approximately 153 miles of revenue track of which 88.6 miles or 58 per cent is used by city cars only and 64.3 miles or 42 per cent by city and interurban cars. This track construction is classified as follows: 1st Class—90-lb. rail and heavier on concrete base; 62.9 miles; 41 per cent; 2nd Class—90-lb. rail and heavier on gravel ballast; 74.8 miles; 49 per cent; 3rd Class—Rail of lighter sections on gravel ballast; 15.2 miles; 10 per cent.

Of this total revenue track, 14 miles, or about 9 per cent, is comprised in special work layouts and curves. We have about 250 special trackwork layouts in the city, of which thirty are in the downtown loop district. Of the total mileage involved in these layouts, interurban cars operate over 50 per cent in the loop and 33⅓ per cent in the districts outside the loop. These thirty layouts represent an expenditure of $300,000 with nearly $100,000 additional for pavement.

Quarter Billion Ton-Miles in 1920

During the year 1920 the mileage made was as follows: City cars, 12,490,988 miles; interurban passenger cars, 984,502 miles; interurban freight cars, 152,301 miles; total, 13,627,791 miles. In terms of ton-miles this amounted to 241,950,438 ton-miles for city cars, 35,122,819 ton-miles for interurban, and a total of 277,073,257 ton-miles. This is an average of 1,800,000 ton-miles per mile of track. These figures are for dead-load only, and they do not include any miscellaneous cars such as work cars, sweepers, etc.

Our experience has shown that first-class track in paved streets should not require maintenance for a period of ten years when subjected to a normal amount of traffic of, say, three-minute headway with city cars or about eight years if hourly interurban service is carried in addition.

Experience With Lorain Weld Joints

In 1913 we welded 3,000 joints on both old and new tracks, using the Lorain electric weld. This type of joint proved very serviceable and has prolonged the life of track so reconstructed. We have had several instances where the wear on the ball of the rail has decreased its section until it no longer had sufficient stiffness to carry heavy loads and failed by fracture immediately below the ball at the juncture with the web, the joints remaining in fairly good condition. One case is the track on College Avenue between Massachusetts Avenue and Fall Creek, consisting of Lorain Section 80-335 7-in. high T-rail laid in 1902. This was the first concrete construction, full tied track in the city, and carrying probably the greatest mileage and tonnage of any track outside the loop district. There is no doubt in our minds that the welding done on this in 1913 prolonged the life of the joints and saved the maintenance cost of the pavement which usually gives the first evidence of joint failure. The paving on this street, excepting at the joints which was naturally repaved with the welding, and excepting 18 in. outside the rails relaid at the time of street reconstruction, is the original paving laid in 1902. Up to a year or so ago the appearance of wear was uniform, that is, the dip and bad pavement at each joint, usually identified with bolted construction, were missing.

Failure of this method of welding usually occurs by ordinary vertical break immediately adjacent to the weld, or the ball of the rail breaks out over the weld. This has been our experience with old rail and we think it partly due to stresses resulting from lack of periodical grinding. The welds made on new rail up to this time have been very satisfactory and the breakage has been considerably less than 1 per cent. One track containing 250 such welds

*Abstract of paper presented before Central Electric Railway Association's annual convention at Indianapolis, Ind., Jan. 26 1922.

with about eight-minute city service has had no breaks.

Arc Welding on Old Track Reasonably Successful

From 1914 to about 1918 no welding of new track was done, but considerable resistance arc welding was done on old track of all sections. This method of welding has proved reasonably successful and has only been resorted to in old tracks which we hoped to reconstruct in the near future. Some 14 miles of 70-lb. track, most of it twenty years old, has been welded since 1912 with the arc welder. Our method has been to cut the base of the angle bar on the gage side and invert the bar on the outside, thus giving the outside of the ball a support. In some cases where tracks were out of surface we have re-tied the joints and a few feet each side, tamping the joint and leaving the quarters suspended for a day or so under traffic. By this method a considerable amount of the surface bend can be ironed out. Instead of using plain gravel for this work, we used a mixture of cement and gravel in the ratio of about 1 to 7. In some cases we bonded around a joint of this type in order to insure the proper return. Some of these welds have proved exceptionally good while others failed, the greater percentage failing by the weld breaking loose. It appears that this class of weld can be made to give good results, but the personal equation enters to a greater extent than in some of the other methods of welding.

Another piece of track reclaimed by the use of the arc welder consisted of 90-lb. Lorain Section 206 in 30-ft. lengths which was very bad looking before reclamation. The rail was laid in 1894 and on very little ballast, and while small repairs were made in 1910, a complete reclamation was made in 1916 and 1917 with very satisfactory results. Twenty-five per cent of the ties were renewed, mostly at joints, and every joint was welded. In some cases where bolts were loose, the plates were removed and cleaned; and if the bolts were tight, the old plate was welded by adding a ½-in. square rod along the top of the plate to carry the welding strip. Tie plates were put under all joints, these plates being old 9-in. flat joint plates. All cups in the ball of the rail were filled by arc welding and then ground to surface with a rotary grinder. The track was very smooth riding when completed and the results were gratifying. This track carries 20-ton cars and is a short line with a ten-minute service. No bonds were used, and as a rule they are not used in this type of weld except on trunk returns. In all, some 500 joints were welded at a cost of 90 cents per joint for trackwork, and as the entire street was repaved with brick and stone liners, the paving was $1.50 per square yard. This low cost per square yard is due to the fact that portions of the paving base were not disturbed. The total cost was $15.460 or $2 per lineal foot of single track.

As usual, dry mix was used to bring some joints up to proper surface. This small expenditure per foot has again put this track in condition to last at least eight to ten years with present traffic conditions. Considering the fact that the rail at the time of welding was twenty-two years old, we cannot expect much more. Up to date we have had only one break, this record being due perhaps to the class of welder we had. In this case credit should be given to the personal factor in obtaining the foregoing results.

Two years ago a double-track electric over single-track steam 90-deg. crossing made of solid manganese broke down at several of the frog points and appeared to be destined for the scrap pile after only six years service. As a last resort we tried arc welding, using gasoline and a wire brush to clean fractures thoroughly. The points were then built up, soft steel being used and applied in thin layers, each layer being pounded with a hammer while hot to compress the metal. This process was continued until it was built up to the last ⅛ in. and then hard steel of the grade recommended for manganese work was added. This crossing remained in fair condition for some time but in the two years the points have been rewelded twice by the foregoing method, as the welded portion disintegrated by flaking off.

Thermit Welding Costly But Justified by Results

In 1917 we became interested in Thermit welding, but up to 1919 the use of it was limited to combination joints and built-up frogs, the latter being the result of the high prices prevailing for special pieces. If the Thermit method of rail fastening is used, we find that there are three grades of rail that can be welded, with some question as to the wisdom of so doing with the last two: (1) new rail; (2) rail that has been in service for about eight or ten years with moderate traffic, and joints (bolted type) beginning to cup and get loose; and (3) rail of the same age or older that has been subjected to severe traffic.

In the last couple of years we have Thermit-welded two streets of the latter two types to reclaim them, with the hope that our judgment will be vindicated. On Central Avenue from Tenth to Nineteenth Streets, approximately 3,700 ft. of double track was reconstructed in 1911, Lorain Section 95-297 being used on white oak ties laid on concrete base. During the last year or so some 40 per cent of the joints showed evidence of pounding and breaking the bond with the immediate pavement. As we did not wish to postpone repairs until rail breakage developed we decided to "Thermit" all joints that showed any evidence of pounding and regrind all of the 280 joints.

A total of 114 joints were welded and ten cases of broken rail were found, these breaks occurring along the line of the bolt holes. The actual welding was done between midnight and morning, the joints being excavated and back-filled during the day on account of the street being narrow and the impossibility to keep automobiles from driving into the excavations. The original joint plates were the eight-hole continuous type, thus leaving about ⅝ in. space between the base of the rail and the tie after welding. Tie plates ⅝ in. x 8 in. x 10 in. were used to give bearing and spot-welded to the base of the rail to hold them in place, as in most cases the ties were cut away to permit the necessary width for the moulds, the original spacing of ties being too close and we did not desire to excavate and respace them. This work of 114 joints was accomplished at a cost of $13.56 per joint for track and $9.84 per joint for paving; total, $23.40 per joint. As these rails were all 62 ft. in length it made the cost per foot of track about 76 cents.

Records show that the number of scheduled cars operating over this track in the ten years was 930,185 or 3,720,740 car wheels on each rail. As the cars all weighed 20 tons, it gives us 18,603,700 tons of weight per track.

This welding was completed in July, 1921, and we have had two breaks since, both of which were rewelded by waxing the joint and pouring additional Thermit.

The track on Massachusetts Avenue between Alabama Street and College Avenue is the extreme case in the types of track formerly referred to. This track was constructed in 1910 of Bessemer rail, Lorain Section 91-375, 7 in. high on white oak ties imbedded in concrete or monolithic from sub-grade to paving base. This track became so rough at the joints that it was decided to use Thermit in an effort to delay reconstruction at least three years, or for a period that would justify the expense.

The portion of the street used by vehicles was resurfaced in the summer of 1920 and this company relaid 18 in. outside the rails at that time, omitting the grouting at the joints until we could do the welding. Crossovers were placed on the streets and welding was started in October. As this is a trunk line and handles all cars to the northeast section of the city, or about sixty city cars per hour during tripper times, our welding was all accomplished between the hours of 9 a.m. and 3 p.m. and 10 p.m. and 5 a.m.; that is, in the off-peak hours.

As the work progressed we found every joint in the entire length of 2,700 ft. of street to be broken. We could not afford to remove the 18-in. strip of pavement only recently laid, so 6 to 10-ft. pieces were put in on the outside rails and welded, while the inside rails were cut and the rails were driven ahead. This method not only eliminated all the bolt holes but the cupped rails as well and also located the new joints on better ties, the old joint ties being cut severely in several cases. Where ties were cut, they were adzed and either steel or wood shims

with holes drilled in them for spikes were added to bring to surface.

Before track and paving gangs had completed the work we had eleven breaks due to the new conditions imposed upon the rail in welding. Since then we have had six breaks, four occurring during last winter and two just recently. In each case they were rewaxed and welded. A recent inspection of this track shows it to be holding up in fair shape and it appears that the expenditure made, while large, was justified. On this street, 264 welds were made at the following cost: track, $30.00 per joint; paving, $15.00 per joint; total, $45.00 per joint. As the track rehabilitated consisted of 5,400 ft. of single track, the cost was $2.20 per foot, or a total cost of $11,772.87.

Operating statistics show that during the year 1920, 319,263 trips of city cars and 55,773 trips of interurban cars, or a total of 375,036 trips were made over this stretch of track. Therefore in the past ten years 15,001,440 wheels passed over each rail. This amount of travel is equivalent to 78,681,030 ton-miles for that interval. These figures, as in the previous estimate, do not include work cars, sweepers, etc., and are based on dead load of cars only.

In preparing this paper I have endeavored to relate our experience and some of the results obtained in the reclaiming of track by the different welding methods, and have avoided mentioning the rebolting as I believe most of us are only too familiar with that process. While I think arc welding by motor-generator set reduces the importance of the personal equation and should be mentioned, I regret that I cannot offer any experience in regard to its use.

Reclaiming Track in Paved Streets*

Use of New Base-Supporting Joints Under Old Rail May Double Life of Rail for $8 to $12 per Joint—Other Elements of Track Reclamation Discussed

By L. A. Mitchell
Engineer Maintenance of Way, Union Traction Company of Indiana, Anderson, Ind.

THE reclaiming of track in paved streets is in reality the reclamation of joints. Track trouble starts at the joints, and the methods that have been tried to hold the joint construction so that the rail ends would not be ruined are probably as numerous as the sections of rail used.

The best method of repairing track is one that will extend the life of the track structure the longest, that is, giving you the greatest return on the investment. This best method these days depends to a very great extent on the money available to make the necessary repairs. It is not so much what shall be done as how much money can be spent.

In reclaiming track the effort is made to eliminate the joints as far as possible and make the rail continuous by making the joints just as strong as the rail itself between joints. This is done in various ways, such as placing steel plates on the ties under the rail at the joints; placing steel ties under the joints; buying new joints and applying to the old rail; welding the old joint bars to the rail; welding specially designed joint bars to the rail; taking old joint bars and inverting them and welding these to the rail; buying new base-supporting joints with larger bolts and redrilling the rail so as to construct an absolutely tight joint.

The Union Traction Company has approximately 60 miles of track in paved streets and approximately the same amount in streets that are unpaved. The track in paved streets as originally constructed of 70-lb. A.S.C.E. rail, 80-lb. A.S.C.E. rail, 6-in., 60-lb. rail Lorain Section 263, 6-in., 72-lb. Lorain Section 331, 5¾-in. 60-lb. rail Illinois Steel Company 6012 and some of 40-lb. T-2 rail. Our interurban service operates over a little more than one-third of this mileage and naturally this portion of the track in paved streets has presented the greater part of our track problems.

The track on which our ordinary city service is operated has required comparatively little attention until from ten to fifteen years old, depending principally on sub-soil conditions. But the track in paved streets constructed for ordinary city service and then subjected to the interurban service has required attention in a much shorter time.

In repairing city tracks, of course, the first consideration is the foundation. Good drainage should be provided if possible and good sound ties under the joints. Then it is a question of how the joint itself should be dealt with. We first tried the installation of a plate on the ties under the rail which would hold the rails in position without deflection, and these plates were in many cases spot welded to the base of the rail. This proved a very satisfactory method, but of course did not remove all the pound due to the battered rail ends.

Another method that was tried with varying success depending on the age of the rail was the inversion of plain bars and spot welding them to the ball and the base of the rail. Practically all of the rail that was treated in this way was more than ten years old and considerably worn, and we had a large number of breakages in the rail in the web running along under the ball. This method gave us fairly good track for two to three years at a cost of about $4.50 per joint, including the labor of removing and replacing the paving as well as the labor and material in welding.

A few patent welding bars were installed and these gave very good service, and probably would have given better, had it not been for the age of the rail, which broke above the welded bar and under the ball of the rail. In many cases where we inverted the joint bars and welded them to the rail we found that enough of the ball of the rail had been worn off to allow the wheel flanges to strike the bar on the inside. This would ultimately break this bar loose from the rail. We then inverted only the outside bar.

On three or four occasions and at different locations we tried the installation of steel ties filled with concrete for repairing joints on old rail. Owing to the fact that the pound was not entirely removed from this joint we discovered that ultimately the foundation would be broken up and the steel ties bent so that they finally had to be removed. However, this same type of tie in concrete on new construction work with a tight joint was found to be as good as can be obtained.

Booster Ties on Old Rail

We have used a few of the so-called booster ties for old rail in paved street with very good results, probably due to the fact that this tie is cushioned and the shock is absorbed before being transmitted to the adjacent pavement. Spot welding has been used to great advantage in the repair of special work. Many times the life of a frog has been extended a year with an expenditure of $5 by building up battered down joints or filling spaces where pieces of metal have broken out.

I believe that the best results can be obtained on old rail by the application of new base-supporting joints with the same drilling as that in the rail so as to butt the end of the rails together and not allow for any expansion or contraction. The holes are then reamed out so as to use a larger bolt than the original. This bolt should be a machine bolt. The rail should be run tightly together before this joint is applied, and if the rail ends are badly battered the battered portion should be cut off and the rails run together and the joint entirely redrilled. In this way a joint mechanically tight is secured, probably having the same strength as the rail itself so that the wheel loads can be carried without over-stressing the metal. In addition to the application of the new joint the surface of the rail should be welded and ground so as to eliminate all pound. If the joints are kept tight, expensive repairs can be delayed by frequent welding and grinding of the surface of the rail.

Work of this kind can be done at a cost of from $8 to $12 per joint depending on the section of rail and the condition of the ends of the rail. I

*Paper presented before the annual convention of the Central Electric Railway Association held at Indianapolis, Ind., on Jan. 26, 1922.

believe a joint of this type will last the life of the rail. These same results can probably be obtained by the use of the Thermit weld but at a slightly increased cost over the figures above mentioned. As yet we have not used this type of weld on our lines, due principally to the small number of joints to be repaired at a given location.

I believe that the secret of long life track is to construct an absolutely tight and rigid joint either mechanically or by welding so that any movement or deflection that takes place will be of the same character as takes place in the rail between the joints.

Track Reclamation Costs From Fort Wayne*

By H. V. NORFORD
Superintendent Maintenance of Way, Indiana Service Corporation

IN DECIDING on the work necessary for the construction and reconstruction of track in paved streets, it is necessary to take into consideration the fact that every track of permanent nature must have a permanent track foundation; all pavement should have a foundation sufficient to out-wear the rail and pavement, and all ties and other accessories, embedded in the pavement foundation must have equal life with it.

Engineers agree that in a track a pavement foundation if properly laid and drained will last from fifteen to thirty years, depending on the tonnage and frequency of car service and the amount of vehicular traffic passing over it. There is, however a large difference in the life of the track foundation and the pavement foundation and this prohibits the casting of the concrete track foundations and the pavement foundations in one mass. They are separated with a cushion of stone under the base of the ties, which gives a very resilient foundation for the rail. When the rail is worn out and the ties need replacing this construction permits this part of the structure to be renewed without destroying the track foundation. It also allows tamping and rewelding of joints if necessary without building an expensive patched foundation for some distance each side of the rail trouble. The pavement foundation, being only a filler between the ties and not cast to the subfoundation, is more easily removed than the other classes of concrete foundations.

Again on heavy traffic streets the pavement foundation and ties in this class of construction will out-last the rail, and if new rail is laid the only structure that need be removed with the rail is the pavement surface. This can be done without much additional loss to the sub-foundations in resurfacing joint ties or when welding joints by any of the modern methods.

When the pavement surface becomes worn to such an extent that it is impossible to make satisfactory repairs by patching our practice is to take up the entire surface of brick. Joints are welded if necessary and rails are respiked to proper gage and line and that portion between the rails paved with the brick taken up as far as the quantity of good brick reclaimed will admit. All new brick is placed on the 12-in. margin outside of the rail.

This construction provides a track foundation from 6 to 10 in. in thickness upon which is laid a track of either 6-in.—60 lb. 7-in—91 lb. or 100 lb. A.S.C.E. T-rail, as the tonnage warrants. White oak ties 6-in. x 8-in. x 7-ft. spaced 2-ft. on centers are laid upon a 2-in. tamping cushion of ¾-in. crushed stone with a 6-in. paving foundation between and around the ties. Pavement of either a 5-in. granite block or 4-in. vitrified shale block with a mixture of the proper amount of fire clay is used as the vehicular traffic demands; all pavements being sealed with cement grout of a 1:1 mixture. These methods of track construction and reconstructon are outlined so that the data given later may be more readily understood.

Mr. Mitchell in his paper said that "the best method to use these days depends to a very great extent on the money available for making necessary repairs." There is a certain definite point where maintenance should cease and the entire structure should be reconstructed. This limit should be definitely decided by the engineering department before any great amount of money is expended on a worn-out structure. In order to determine the definite turning point, the cost of reproduction not only of the entire structure but of every detail thereof based on current prices must be known together with the depreciation of each and every part thereof.

The following costs were compiled from Fort Wayne construction. From 1910 to 1913 Class A construction 7-in. rail and 8-in. track foundation cost $14.57 per lineal foot. In 1921 the same class of construction cost $25.12 per lineal foot of double track itemized as follows for an improvement of double track 1,832 ft. in length.

Track work	$17,747.00
Bonding	135.00
Track foundation	8,932.00
Drainage	952.80
Pavement and pavement foundation	17,588.86
Repairs to overhead work	666.00
Total cost	$46,021.66

This gives $25.12 per lineal foot of double track.

The increased cost of a few materials f.o.b. Fort Wayne were as follows: Rail in 1914 was $38 per gross ton and in 1921 it was $66 per gross ton, or an increase of 74 per cent. Cement in 1914 was $1.20 per barrel and in 1921 it cost $2.42 per barrel net, or an increase of 102 per cent. Ties, white oak, 6 in. x 8 in. x 7 ft. in 1914 were 78 cents each and in 1921 $1.38 each, or an increase of 77 per cent. Paving brick in 1914 were $20 per thousand and in 1921 were $42.50 per thousand, an increase of 112 per cent. Cast welded joints in 1914 cost $10.22 each, in 1921 they cost $17.84. Arc welded joints in 1921 cost $4.64 each by welding old joint plates with new 1-in. bolts to the rail and by welding an 8-in. x 12-in. x ⅝-in. steel girder plate directly under the joint. We also found by metering current used on each joint for approximately 540 joints that the power cost was 88 cents per joint.

Approximately 300 joints were welded by the Thermit process to 7-in.—95-lb. rail in the fall of 1920 at a cost of $15.23 each. This work was done under a three-minute headway of service and an average of twenty joints per day was made. Our Thermit welding varies from $14.60 per joint to $23.50 per joint, depending on the number of set-ups we are able to make per day. This includes finishing the joint but not paving. Paving on the above welding ranges from $4.10 to $8.60 per joint.

This year 7-in.—91-lb. rail costs $1.76 per lineal foot of track, and 6-in.—60-lb. rail costs 81 cents per lineal foot of track. Pavement in 1922 costs in Fort Wayne $5.36 per square yard.

In view of the above costs I believe we should thoroughly inspect and study depreciated track structures before applying a cost of from $2 to $5 per lineal foot of track for joint troubles, especially as in the very near future we may be required to repave or reconstruct this structure. Railways should hesitate before placing this additional welding expense on a track that is out of line and surface, with pavement loose along the rail so as to allow the surface water to penetrate the substructure. They should also hesitate before building welded special work layouts in their own shops to replace bad special work in track structures which with fixed overhead expenditures places the final cost of this work on a par with manufactured special work. I do not favor the "slapping" of any old kind of welding material on top of a rail ball that has from ten to fifteen years life in it in order to eliminate the pound on the joint, where the right treatment is to raise the joint properly, weld it and grind the ball to a true surface.

When the cost of reclaiming joints on old worn rail plus the pavement and repair costs per annum equal or exceed the interest and investment on a new structure, I think it is time to consider complete reconstruction.

*Abstract of discussion on "Reclaiming Track in Paved Streets" at the annual meeting of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

Welding Postponed Rail Renewal*

By R. J. CUSTER
Engineer of Way and Structures, Interstate Public Service Company, Columbus, Ohio

THE Interstate Public Service Company fortunately is not burdened with the large mileage of city tracks as are most companies, yet we have had our problems proportionately.

We have several miles of track in

*Discussion on "Reclaiming Track in Paved Streets" at the annual convention of the Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

paved streets laid with 4⅞-in., 75 lb. T-rail over which operate 28-ton interurban cars. About 800 joints in this track were repaired by placing a ⅝-in. x 5½-in. x 24-in. iron plate under the joint, inverting the angle bars and spot welding the plates, bars and rail together. Surface welding and grinding finished the joint. This method of joint repairs has proved very satisfactory, considering the type of track to which it was applied. Very few breakages have occured. Those that have shown up were no doubt due to tension strains set up by the contraction of the rail, as it is impossible to get any anchorage in the concrete track structure with a rail of this depth.

In Columbus, Ind., we have about 3,800 ft. of track in a brick-paved street laid with a 4¾-in. 60-lb. T-rail. The operation of 48-ton interurban cars over a track of this sort is very destructive of the track and pavement. This was a condition which we inherited and we had to make the best of the situation. We have managed to nurse this track along for the past three years with the liberal use of the electric welder. Without the aid of the welder we would have had to renew the rail. However, we are now experiencing a great number of rail breaks at the joints due, no doubt, to the heating effect of the welder. No particular method was used on the joints. Where bars were inverted for welding the flange of the angle bar was cut off with the oxygen flame before welding. We feel that we have about reached the limit in patching up the present rail.

We recently rebuilt 1,500 ft. of track in a paved street which had been in use for twenty-five years. This track was laid on white oak ties with an 8⅝-in., 90-lb. rail of the side-bearing or girder type. Under the track was a ⅛-in. concrete floor on which the track was surfaced and filled in with crushed stone, apparently a crusher run product. Over the crushed stone filling a 6-in. concrete foundation had been laid for the brick surface of the street. When we opened up the track we found that the ties were badly decayed and it was necessary to re-tie the entire track. We did not salvage more than twenty ties out of the original installation.

At each joint there was a decided cup in the end of each rail due to the bending down of the rail head. The joint bars were of the usual flat kind used on rails of the girder type, having twelve 1-in. bolts to the joint. We found all the joint plates absolutely tight, not only from the generous supply of bolts but in addition they were thoroughly rusted fast, so we took particular pains not to disturb them. After the track and pavement were completed we filled in the cupped rails with hard steel by means of the electric welder and ground them to a true surface. This gave us a nice, smooth track free from any pound at the joints, and with the light-weight cars which operate over it we should receive many more years of service from the original rail.

Special Joint Supports Prove Highly Satisfactory*

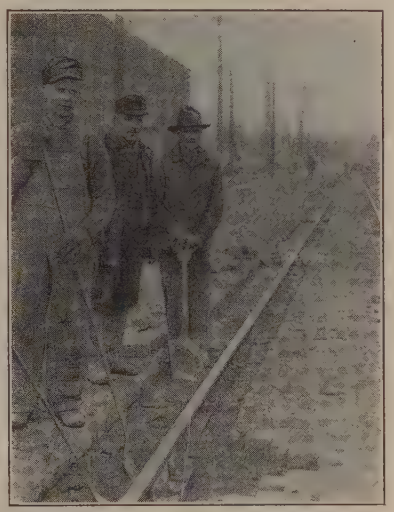
By M. Ackerman
General Manager Cincinnati & Dayton Traction Company, Dayton, Ohio

THE accompanying photographs show the condition of some track in Hamilton, Ohio, when reclamation was started and when the work was completed. The tracks shown had been repaired only twelve months before, when the old-time method of placing shims under the rail, and in some cases retamping the gravel under the ties, was used. The frequent repairs made necessary by this method ran our maintenance charges up very high, as we operate cars varying in weight from 15 to 50 tons.

These constant, unsatisfactory repairs made us look around for some other method, even though it might cost a little more, but we wanted something that would give us a more lasting job. We investigated the Dayton joint booster, because we believed it hit at the cause of our track and joint failures. As is generally known, this joint booster offers a broad bearing surface for the rail ends, and at the same time provides a means of using dry concrete under the booster itself for a foundation.

*Abstract of Discussion on "Reclaiming Track in Paved Streets" at the annual convention Central Electric Railway Association, Indianapolis, Ind., Jan. 26, 1922.

We have always believed that concrete offered the most lasting foundation for track, when it can be protected from the pounding which every track receives, especially at the joints. This protection is provided by the asphalt cushion, which is built into the booster



Showing How Track Was Opened up for Installation of Joint Boosters and Relaying Pavement

itself. The heavy steel plate that is used on the booster block enabled us to weld the base of the rail to it, and we also weld the angle bars to the rail, thereby, overcoming the necessity of bonding. If the rail ends were battered, as they were in most cases, we filled up the cupped portion with new steel and then ground it down to a smooth surface.

Our work of reclaiming tracks by this method has been going on now for two or three years and to date we have reclaimed approximately 5 miles of single track in Hamilton, where we use 80-lb. T-rail in 30-ft. lengths, about a half mile of single track in Miamisburg and 1½ miles of double track in Dayton, where we use Lorain Section 91-375 in 60-ft. lengths. The track in Dayton has boosters under about 75 per cent of the joints. The other 25 per cent appear to be in good shape, so we did not consider it necessary to disturb them at this time.

Typical Appearance of Track and Paving Before Reclaiming

Typical Appearance After Repairing Joints and Paving

The work in Hamilton, where the track and paving were in such bad shape that practically 50 per cent of the paving had to be repaired, was done at a cost of $13.88 per joint, exclusive of the cost of repaving, and $23.81 per joint including paving, or 93 cents per lineal foot of single track exclusive of paving, and $1.60 per lineal foot of single track including paving.

In making a permanent repair of this kind, we saved ourselves the expense of rebuilding, which would have meant new rails, new ties, and all the inconveniences that go with reconstruction, while this work was done without any disturbance to traffic. In fact, the continuous operation of the cars over the track helped to tamp the concrete under the booster and consequently got it seated more firmly. To date we have not had a single failure, so that this method has more than proved its worth.

The expense involved at Hamilton and the results obtained were so satisfactory that when the city commissioners of Dayton were giving serious consideration to the repaving of South Main Street, we stepped in and made our repairs the same as we did in Hamilton, and forestalled the improvement at this time as far as the railroad is concerned. This work, consisting of placing the boosters under 75 per cent of the joints, welding and building up the cupped rails, and repairing all the bad paving, whether at the joints or in between, cost us 70 cents per lineal foot of single track, and was done without any interruption to traffic.

You can readily see that we have effected a tremendous saving over the cost of new track and paving, and are thoroughly convinced that our manner of reclaiming track is the best known method today, and will give us years of additional service out of the old track.

Trot Out the Cookie Jar*

A Refreshing Discussion on Public Relations—Some Valuable Hints on Advertising Methods and Relations to Newspaper Publicity

BY LABERT ST. CLAIR
Director Advertising Section American Electric Railway Association

THE more I see of public utility managements that are successful in their public relations work, the more I am reminded of the methods by which Aunt Sally Ann Dusenberry made herself the best-liked person in my home town out in western Indiana and also got folks to do for her the things which she wanted done.

Aunt Sally Ann was a widow, capable, past forty probably, the possessor of a house that was immaculately clean, a disposition that was always congenial, and a two-gallon brown stone jar that was always full of cookies. Folks were naturally attracted to her house by its extremely clean and inviting interior and exterior, and also by the big-mouthed cookie jar. Aunt Sally Ann had more visitors and friends, I reckon, than anybody else in town. They ranged from boys in knee trousers and little girls in long skirts to the oldest inhabitant who bragged that she was so aged that she had worn out three sets of vitrified false teeth.

GOT THE WORK DONE

Aunt Sally Ann had a powerful lot of work to be done around her house and she always seemed to get it done with the minimum effort. In fact, the mothers of various boys around town wondered how Aunt Sally Ann induced their offsprings to carry in her wood, cut her grass and do other little chores so willingly when they found great difficulty in inducing the boys to do anything. The answer to this situation was that the mothers usually ordered their boys to do the job or suffer the consequences, and Sally Ann took the other way around and got the job done by arousing their self-interest in her cookie jar.

And so, as I frequently come in contact with the public utility managements of the country which are making a success of their public relations and those that are making little progress with theirs, I seem to see an analogy between their methods and those of Aunt Sally Ann and the boys' mothers.

We might consider for a moment the fact that Aunt Sally Ann always had her house in order to see if there is any analogy between this and the public utility men who are getting public cooperation. I think there is a very distinct analogy. If you will investigate the background of the managements that are enjoying pleasant relations, you will find that these men long since have put their houses in order either by explaining a way through advertising any misapprehensions that the public may have had about the cleanliness of their houses, or by sweeping out dirt where it actually existed. I do not mean by this that all companies which are not enjoying good public relations necessarily do not have clean houses, but if there be any which haven't, it might be worth while to consider sweeping up as a progressive step.

The second attractive feature about Aunt Sally Ann's public relations is, unfortunately, one that still requires much attention in the public utility field. That is, her never failing cordiality and willingness to meet people with a smile and not lecture them despite whatever personal troubles may have been on her mind. The public cares very little indeed for the personal troubles of anyone and it cares still less for the troubles of a public utility unless it can be shown that these troubles are in reality the consumers' own.

There has been much complaining through paid advertising in the public utility field in recent years. I agree that there has been justification for it. Scores of progressive executives with whom I have discussed this question, however, are very doubtful, indeed, if the manifold efforts to excite pity for public utility industries has developed favorable results.

Entirely aside from any complaining which our industries may have done in print, there is need for more cordial contact between many managements and the public. Make a survey of the public utility field and you will find that those men are getting ahead who are meeting the public in the open, who are courting their customers with a smile, in their own offices or in public meetings, and who are always available for frank conference.

Leaders in the electric railway field invariably are those who have ripped out the frosted glass between them and the public.

We now come to the last feature of Aunt Sally Ann's public relations program, which I believe, is the most important feature of all of it. That is the fact that she handed out cookies instead of orders.

The only way on earth to induce people to do things that you want them to do is to arouse their self-interest in your proposal by showing them where it will benefit them. It is true that you can get some things done by ordering folks to do them, but a friendly, co-operative spirit, a desire to come back and do more things for you, is not created in this way. *You must show them the cookie.*

THE MANAGEMENT COOKIE

The first step toward all good public relations is for the management to hold out a promise of a cookie to itself. There are many kinds of cookies to which all managements aspire. There is the increased income cookie, which, of course, is of interest to us all, but there are others. Hard-working public utility managers throughout the United States seek the cookie of satisfaction from giving good public service and from being a real power for good in building up their communities. It is vital to success.

THE EMPLOYEE'S COOKIE

Co-operation of employees is absolutely essential to good public relations. Cookies will get it. Altogether too many persons are prone to believe that the only cookie in which the employee is interested is the increased wage cookie. Of course he is interested in that, but there are many other kinds of cookies he cares for. There are thousands of capable, loyal, energetic public utility employees who are putting forth their best efforts to help

*Abstract of paper presented before Central Electric Railway Association, Indianapolis, Ind., Jan. 27, 1922.

advance their company interests because of their pride in real accomplishment and not alone for the monetary return that their efforts bring them.

Courtesy is the biggest sales developer for a public utility company that an employee can possess, and untold numbers of them are courteous not because to be courteous means a few more dollars in their pay envelopes but because it is a distinct pleasure to them to treat people cordially and politely. A few signs around public utility offices, in street cars, and in other places where the public comes in contact with employees saying that the employees are picked because they are courteous fills the employees with pride in their work, which is a cookie much to be desired.

Again, the substitution of names of employees for numbers, as in the case of conductors and motormen, or the placing of name plates on the desks of employees gives them a feeling that they have ceased to be mere cogs in the great public utility machine. They have become men and women charged with the responsibilities of sufficient importance to make them meet the general public on the same ground as do good salesmen and bring their individuality into play. And who will say that feeling is not a cookie?

The Newspaper Cookie

The importance of enlisting newspaper support in every community cannot be minimized and here again cookies can be used to advantage. I know that it is the custom for persons who have not made a careful study of the real workings of newspapers and their proprietors to say that you can buy the support of any newspaper in the land if you approach it with an advertising contract cookie of sufficient size. I do not believe for one minute that this is true. Of course, all newspapers are interested in advertising contract cookies, and they are not to be blamed for that. They thrive on advertising and it is proper that they should sell it and it is entirely proper that the men who use their space should pay them for it.

But the advertising department of a newspaper is only one department.

There is the news section which is just as anxious for its news cookie as the advertising section is for its advertising cookie. The editorial staff of a newspaper has only a passing interest in the advertising department, regarding it as a sort of a necessary evil whose duty is to fill up blank space in the paper not required for news. The cookie that the editoral staff desires all the time is news. There is news on every public utility property in this country and if properly presented to the news section of a newspaper it will be seized eagerly and devoured.

At the same time it is a great mistake to attempt to present the news section with a dog biscuit in the shape of advertising that should go into the display columns and attempt to tell the editor that you have a nice wholesome cookie for him. This cannot be done very many times, and the advertising man or publicity man who continues to try it is not going to last long in his chosen field. It is a mistake for any publicity man to attempt to convince public utility operators that he can get printed free of charge material that has no news value but should go into the advertising columns. It is a greater mistake for a public utility manager to urge his advertising representative to attempt to get advertising without news value into the columns. The most that the publicity man can do is lose his job, but the public utility manager who gets in bad with the newspaper also can lose their support.

Newspapers everywhere want to do the thing for their towns that will build them up, because as their towns grow so they too will grow. Hence, the job of the public utilities is to show the newspapers that their cookie of future business lies in aiding the public utility to help build up the town.

The Car Rider's Cookie

The car rider's cookie is good service. It is not necessary for me to dwell long on what this should be. This has been covered thoroughly at almost every public utility meeting I have attended in several years. But the selling of service to the public utility patron has not been done intensively enough from the cookie angle. Far too much money has been spent telling the public that it should support its public utilities in order that they may thrive and pay dividends. The consumer has very little interest in dividends except as the cutting off of them might curtail his service. But he does have a very vital interest in the service cookie that brings him rides. This is the cookie that must be held up to him.

The Business Man's Cookie

The cookie that attracts business men is maintaining or increasing business. Except in a few cases, such as Des Moines, where electric railway service have stopped completely and the business man's income has dwindled, the real effect that electric railway service has on his cookie has not been brought home to him.

The merchants of Des Moines did not realize that upon the continuance of street railway service depended their cookie. So they stood by and permitted street railway service to die. But when, within a day or two, they saw their business cookie snatched away from them, they screamed to high heaven for the return of the cars and they never ceased screaming until they got them back. The mothers of Des Moines did not realize that their greatest cookie of all—the safety of their children in going to and from school—was dependent very largely on street car service until street cars stopped. When this happened they organized and worked until their cookie was returned to them.

And so it goes right down the line with every class of persons that is affected by public utilities and that means all classes.

How Motor Transport Influences Interurban Operation*

By M. Ackerman
General Manager Cincinnati & Dayton Traction Company, Dayton, Ohio

MOTOR truck competition has become one of the most vital questions in the operation of interurban freight service; more particularly so since the advent of improved highways. These afford motor truck companies or individuals excellent facilities, for which they are not assessed, but for which the interurban companies are assessed.

The laws in the State of Ohio provide, particularly in the counties through which we operate, that the benefits from the improvement of public highways be assessed against all properties 1 mile on each side of them, thus giving our truck competitors a decided advantage.

It also seems unjust that the motor truck companies be permitted to utilize the highways from town to town without being obliged to file schedules of time and rates. They can thus scalp such interurban rates as are on file, arrange schedules from time to time to suit their own convenience, and can operate without any obligation, except for such moral obligation as they owe shippers.

To cope with this situation, we arranged with our largest competitor to act for us as pick-up and delivery agents in all of the principal communities on our property. This arrangement took effect May 1, 1921, and since that time sixty-four 5-ton Packard trucks have been picking up and delivering to us shipments they originally moved in competition.

Because of this pick-up and delivery the truck company provides a more frequent service than it could have under the former long haul plan. Thus it has the advantage over other motor truck competitors whose equipment is tied up in the long haul movements.

The motor truck company's advertising and solicitation brings in business, which we otherwise would not have got.

In the operation of this service our local class rates are added to the pick-up and delivery charges, making through rates slightly lower than the motor truck company's rates to the same points. But the truck company, which under competitive operation had lost money, is now enjoying a profitable business.

It is our firm belief that by the co-operation outlined above, and through the aid of proper legislation, we can reduce motor truck competition to a minimum.

All freight handled by the pick-up and delivery company is checked and loaded direct into our cars at points along our line, thereby eliminating extra handling.

*Abstract of discussion on "Reclaiming Track in Paved Streets" before Annual Convention, Central Electric Railway Association, Jan. 26-27, 1922, at Indianapolis.

Shipments are handled from our cars to the trucks of the pick-up and delivery company which enables a consignee to receive his goods shortly after the arrival of our freight trains. The old method, of unloading into freight house, necessitated the rehandling and rechecking to the consignee's delivery.

In connection with the foregoing arrangement we have also established what we term a delivery service. For example, the trucks of the National Cash Register Company deliver the finished product to our cars at Dayton, and our pick-up and delivery company takes this material from our cars at destination and delivers it direct to the consignee.

On the other hand, a shipment of castings from Cincinnati, which is picked up by the truck company and loaded directly into cars, is called for at our Dayton station by the National Cash Register Company's trucks, thereby handling the shipment at only a slight additional charge over our class rates. This we term our pick-up service.

The inauguration of this service has had the effect of reducing our claims to a minimum. Claims for concealed damage are settled on a 50 per cent basis. On all other claims, the company responsible settles for the damages. We have experienced no difficulty in settling on this basis with the truck company.

Accounting Is Simple

All shipments are billed out in the same way as other shipments delivered to the freight station. An extra abstract is prepared, one copy going to the auditor of the railroad, one copy to the pick-up and delivery company, and one copy remaining in the station agent's file.

Statements prepared by our agents for our proportion are supported by a copy of the abstract, and sent to the pick-up and delivery company semi-monthly. Payments are made direct to the agents rendering these statements.

Because of the above arrangement our 1921 freight business decreased only 11¾ per cent as compared with 1920, which was our banner year. Our passenger business, however, fell off 16½ per cent for the same period.

In places too small for the pick-up and delivery company to operate profitably, local express men pick-up from and deliver to shippers. This takes care of freight formerly picked up by our truck competitors. The local arrangement, which is on the basis of a flat rate, has drawn considerable business, both local and interline.

If we are to develop our freight business in the face of strong motor truck competition, which is not confined to direct routes, we must utilize the same motor trucks to bring the business to our stations.

Early in 1920 we were operating between Dayton and Cincinnati, Ohio, three freight motors with a motorman, conductor and freight helper on each, making three deliveries at all points each day. The three freight motor crews were in service from twelve to fifteen hours each day, making it, of course, an expensive operation.

Later in 1920 as the business depression commenced and because of motor truck competition, it was necessary to curtail expenses, particularly in the handling of freight. We reduced our daily freight service to two crews and two deliveries at all points. This was not sufficient to put our freight business on a profitable basis, and early in 1921, in order further to curtail expenses we tried out the following schedule:

At our freight station in Dayton we have a motor and three trail cars; all freight for West Carrollton, Miamisburg and Franklin is carried in the motor; freight for Middletown is loaded into one trailer; freight for Hamilton into the second trailer; and freight for Cincinnati into the third trailer.

Shipments are received up to 2:45 p.m. at Dayton. The motor leaves at 3 p.m. with three trail cars or more, arriving at Cincinnati at 7 p.m. Local shipments are unloaded and loaded for points south, and the trail cars set in at Middletown and Hamilton.

The freight motor and trailer are then left at Cincinnati, for freight delivery and loading the following day. After having stood there all day they leave at 7 p.m. for Hamilton, unloading local shipments at the freight house and picking up one or more trailers loaded for Dayton. At Middletown a trailer loaded for Dayton is picked up in the same way.

The north-bound freight picks up all loaded trailers for Dayton, arriving there about 12 o'clock midnight. This service gives shippers one delivery each day, available at every point along our line at the opening of the freight station the following morning.

Thus with one crew we handle as much freight as we could before with three freight crews and motors. The new scheme requires only ten hours' labor, however, as against a total of forty hours under the old arrangement.

American Association News

Notes on the Midyear Conference and Dinner at Indianapolis

IN A LETTER just sent out from association headquarters, Executive Secretary J. W. Welsh makes the following announcements:

Reduced rate transportation by the "Certificate Plan" has been requested from the Railroad Passenger Associations. All those who go to Indianapolis are requested to ask for certificates when purchasing railroad tickets, for the benefit of others, whether they expect to use the reduced rate privilege on the return trip or not. It is necessary that 350 should be secured in order to obtain half rates on the return trip.

A special dinner for ladies attending the Midyear Meeting has been arranged. The same entertainment and dinner will be furnished in a separate room and the price will be $5 per cover. Reservations for this dinner should be forwarded as promptly as possible to association headquarters or to Harry Reid, president of the Interstate Public Service Company, 510 Board of Trade Building, Indianapolis, Indiana, who is chairman of the dinner committee.

Comprehensive Membership Campaign Planned

A MEETING of the American Association committee on company and associate membership was held at the William Penn Hotel, Pittsburgh, Pa., on Jan. 25. The members in attendance included F. R. Coates, Toledo, Ohio, chairman; L. E. Gould, Chicago, Ill.; P. N. Jones, Pittsburgh; H. H. Norris, New York; K. A. Simmon, Pittsburgh (representing M. B. Lambert); E. M. Walker, Terre Haute, Ind.; E. P. Waller, Schenectady, N. Y., and E. F. Wickwire, Mansfield, Ohio. There were also present Executive Secretary J. W. Welsh and, by invitation, F. J. O'Brien, Chicago, and R. W. Williams, Pittsburgh.

Mr. Welsh summarized the membership situation with regard to recent changes, and agreed to prepare a list of members in arrears for dues with a view to having them seen by members of the committee, if possible, before their names are removed from the rolls.

In regard to securing new members it was agreed that a list of "prospects" should be prepared and divided among the members of the committee for follow-up. Assignments are to be made on a geographical basis, as follows: W. R. Alberger—Arizona, California, Idaho, Nevada, New Mexico, Oregon, Utah, Washington; F. G. Buffe and Rolla Wells—Colorado, Kansas, Missouri, Nebraska, Texas; F. R. Coates—Alabama, Florida, Georgia, Louisiana, Mississippi; L. E. Gould—Illinois, Iowa, Minnesota, North and South Dakota; J. H. Hanna—Delaware, District of Columbia, Maryland, Virginia; P. N. Jones and M. B. Lambert—New Jersey, Pennsylvania, West Virginia; H. H. Norris—Connecticut, Maine, New Hampshire, Rhode Island, Vermont; W. S. Rodger—Michigan; E. M. Walker—Arkansas, Indiana, Kentucky, Tennessee (with L. E. Gould), Wisconsin; E. P. Waller—Massachusetts, New York; E. F. Wickwire—Montana, North and South Carolina, Ohio, Oklahoma, Wyoming.

It is understood that a sub-committee will prepare material for use by the main committee, including a list of advantages of membership with possible later elaboration to form a booklet on this subject. The committee adjourned to meet at Indianapolis, at 2 p.m., Feb. 27.

Recent Happenings in Great Britain

Fares, Wages and Prices All Being Readjusted—£648,000 for Edinburgh Electrification

(FROM OUR REGULAR CORRESPONDENT)

OWING to depression in trade, high wages, high cost of materials, and so forth, the past tramway year in Great Britain has been indeed a dull one. In some respects, however, the corner has been turned. While there is not yet much sign of improved trade, wages and prices have begun to come down. The index figure of the cost of living is steadily falling. Threats of strikes by tramway employees have been met by means of the sliding scale and the only matter still in dispute is the guaranteed forty-eight-hour week.

Fares Reduced from High Levels of War

A few tramway undertakings have already begun to reduce fares from the high levels reached since the end of the war. This is being done in the hope that increased patronage will counterbalance the reduced fares. A few schemes for extensions of track are in prospect, the hope of the promoters being that before the contracts are let prices will have further fallen. No new steam railway electrification work has been put in hand during the year, but a reduction in cost and a possible government guarantee of interest on the new capital may help things forward soon.

Electricity District Proposed to Be Created

The railways owning the main lines running out of London are interested in the proposals of the electricity commissioners to constitute a London & Home Counties Electricity District to be administered and controlled by a joint electricity authority. The scheme has yet to be finally adjusted and confirmed, but the aim here as elsewhere (under the provisions of Electricity Supply Act) is to co-ordinate, consolidate and develop the supply of electricity for all purposes, and to erect great generating stations which will supersede many smaller ones.

The County of London Electric Supply Company has now been authorized to build a station of 100,000 kw. capacity at Barking, and it seems that the railways will not be encouraged to build power stations of their own when they go in for electrification, but to take the energy from a supply company or authority. The railways naturally want to be assured that they will get the power as cheaply as if they produced it themselves. They are to have only one representative on the joint Electricity Authority, which is to consist of twenty-seven members.

The London County Council has approved a report by its highways committee on the question whether a by-law to make it an offence for any vehicle to pass a tramcar on its near side where passengers are entering or alighting would have the effect of reducing the number of street accidents. The committee considered that there would be little doubt that the driving of vehicles between a stationary tramcar and the curb is a source of many accidents and it had for some time attempted to find a remedy.

In April last the Minister of Transport, when approached by the committee stated that it was doubtful whether he possessed the power to sanction such a regulation, and in any case it was unlikely to be considered desirable to do so. In October, a deputation from the Municipal Tramways Association was informed by the Ministry that the matter would be further considered. The highways committee now proposed that the attention of the ministry should be called to the serious increase in the number of accidents at fixed stopping places caused by overtaking traffic and that the ministry should be asked what steps it was proposed to take to safeguard the public.

Wide Powers Enjoyed by Glasgow Corporation

In this connection it is desirable to point out that the Corporation of Glasgow has for some years possessed the power in question, but that many other towns have sought it without success. For some reason or other the municipality of Glasgow succeeded in obtaining powers which are denied to other local authorities. For example, a good many years ago—about the time when electric traction was being generally adopted for Glasgow tramways—the Corporation managed to get an Act passed by Parliament to enable it to fix "rosettes" to the walls of buildings for supporting the span wires whether or not the owners of the agreed. In other towns this substitution of rosettes for big steel poles at the curbs of the footpaths can only be carried out if the owner of the building consents.

In regard to the present case, it appears that under a private Act of Parliament passed some nine or ten years ago, the Glasgow Corporation obtained wide powers to make by-laws. These covered the regulation of street traffic, and one which was put forward provides that when a tramcar is standing at a stopping place every driver of an overtaking vehicle who intends to pass on the near side shall draw up until the roadway is clear of passengers entering or leaving the car. This by-law was in 1915 presented to the Sheriff of Lanarkshire (the local law authority) and he sanctioned it, and soon afterwards it was confirmed by the Secretary for Scotland (who is a member of Government) and thus it became law.

During recent time several English municipalities owning tramways have tried to get Parliamentary powers to the same effect but they were unsuccessful. The Ministry of Transport has set its face against such a regulation as obstructive of general street traffic, and English municipalities evidently have not the general power possessed by Glasgow to enforce such a regulation themselves. On the general question, it may be said that in most if not all towns outside of London, such a regulation might be worked without undue street blocks of traffic and would undoubtedly conduce to the safety of tramway passengers. In London, however, the volume of general vehicular traffic on the main thoroughfares occupied by tramways is so great and the tramcars are so frequent, it seems probable that such a regulation would involve at the stopping places at busy centers a more or less perpetual blockade of general wheeled traffic.

£648,000 for Electrification in Edinburgh

R. S. Pilcher, general manager of Edinburgh Corporation Tramways, has prepared a statement showing the proposed order in which the present cable tramway routes should be electrified. He divides the system into eleven sections and gives successive dates ranging from May, 1922, to September, 1923, at which the work should begin on the several sections. In view of the fact that prices are falling, it is expected that the whole work will cost less than the estimate, £648,000, which is based on present prices. In the end of December the Town Council finally decided to proceed with the electrification on the overhead system.

Abandonments Threatened in English Cities

The local tramway at Taunton some time ago ceased to run the cars because of a dispute with the Town Council over the charge for power. The Council urged the necessity of restoring service on the ground that the present omnibus service was inadequate and unsatisfactory. The Mayor stated that before the cars could be run again, another Provisional Order (the equivalent of an Act of Parliament) would have to be obtained and that it would take at least twelve months to do this.

In Scarborough a threatened cessation of tramway services has been avoided. The Scarborough Tramway decided to stop working at the end of 1921. The traffic is largely seasonal and the tramway, which was placed in service in 1904, has never paid a dividend. An offer from a group of engineers to purchase the undertaking ended the difficulties, however. It is stated that the new company will run omnibuses in conjunction with the tramways.

News of the Electric Railways

FINANCIAL AND CORPORATE :: TRAFFIC AND TRANSPORTATION
PERSONAL MENTION

Des Moines Injunction Unwarranted

State Supreme Court So Holds in Franchise Case, But Orders Trial of Issue on Merits

The Iowa Supreme Court has overruled the decision of Judge James C. Hume in the District Court of Polk County, who granted a temporary injunction restraining the holding of the recent franchise election in Des Moines, Iowa. The members of the Supreme Bench held unanimously that the trial judge in the lower court erred in granting the injunction.

Both sides in the case are claiming a victory in the ruling. The attorneys for the city and for the company feel that the ruling will go a long way in killing the action of the North Des Moines Improvement League when the case is tried on its merits in the lower court. On the other hand, Former Corporation Counsel Byers, who fought the case for the Improvement League, contends that the ruling was only with regard to the holding of the election and that the merits of the case remain to be decided.

The decision of the State Supreme Court was written by Judge Evans. He said:

> Though the ultimate merits have not been ignored by the respective counsel in their arguments here there is no suggestion that such merits be settled by decision at this time.
>
> In view of the narrow scope of the question as presented we prefer neither to intimate nor to form any opinion as to final merits of the case. The order granting the temporary writ took the form of a decree and was based upon an expressed finding sustaining the grounds of balance to the validity of the proceedings. Such a finding purported to adjudicate to that extent the final merits of the main case before it had been tried or put at issue.
>
> The function of an injunction is not to throw a monkey wrench into the moving machinery of either party except for the purpose of preserving in pending litigation some right which otherwise would be irreparably lost.

The franchise election was held on Nov. 28. On the Saturday preceding, Judge James C. Hume of the District Court, acting upon an injunction proceeding brought by Grant Van Horn of the North Des Moines Improvement League enjoined the holding of the election. The case was put before the Supreme Court informally on Sunday and an order dated Monday was issued by the higher court suspending the operation of the injunction in so far as the holding of the election was concerned. It is thought that the case will not be heard in district court before the latter part of February at the earliest.

A day previous to the overruling of Judge Hume's injunction the Des Moines City Railway filed its formal notice of acceptance of the franchise with the city and posted the $10,000 bond required by the franchise.

There is a general feeling among the citizens of Des Moines that the franchise election is settled and the public seems to be more than satisfied with the quality of service now being furnished by the Des Moines City Railway.

Lively Detroit United Meeting Anticipated

Although threatened with a mandamus action to force action in carrying out the provisions of the ouster ordinance to compel the Detroit United Railway to remove its tracks from Fort Street and Woodward Avenue in Detroit, Mayor Couzens stated that he is not ready to require the company to take its cars off the streets where franchises have expired. He would appear to be holding the ordinance over the head of the company for possible use as a club to force the company to come to terms which more nearly represent the ideas of the city than any so far proposed. Mr. Couzens has purchased one share of the capital stock of the Detroit United Railway and expects to sit as a stockholder at the annual meeting of the company on Feb. 7.

The Mayor's interest in the coming meeting was increased by the announcement by A. Avila Gingras, Montreal broker, that he controlled by proxy a majority of the stock.

The meeting will be an important one since the company must at that time decide whether it will sell its system to the city at a price agreeable to the city officials or tear up its tracks from Fort Street and Woodward Avenue. The city's offer of $388,000 for these tracks, which it is understood still stands, was rejected some time ago by the company. Although the ouster ordinance was passed by a majority in excess of 60 per cent of the voters, no definite steps have been taken by the city to enforce its provisions.

Reports now in circulation are to the effect that efforts are being made to bring about an agreement among all the various factions involved prior to the annual meeting.

In announcing his intentions to bring a mandamus action to compel the Mayor to enforce the ouster ordinance, a local attorney charges that the terms of the ordinance have been evaded and that the fact that the Mayor proposed the ordinance was responsible for his re-election. Other city officials who are charged with responsibility for not enforcing the ordinance are the Corporation Counsel and members of the City Council. The writ, issued by Judge Harry J. Dingeman, orders the city to show cause why the ouster ordinance should not be enforced at once. It is made returnable on Feb. 11.

New Franchise Ready to Be Presented to Dubuque Council

The franchise ordinances over which the officers of the Dubuque (Ia.) Electric Company and the city commissioners have been counseling intermittently for the past several months is understood to be ready to be presented to the Council.

When the franchise renewals for operating street cars and the light and power utility were presented originally last fall, the Council and corporation representatives were unable to agree on some points. The original drafts have been considerably altered, it is said, in the various conferences which have been held.

A special election to secure a vote of the people on the proposed franchises was contemplated when the measures were drawn several months ago. However, this procedure hardly will be followed now, according to O. E. Carr, city manager. The regular municipal election is less than two months away, and the franchises, if approved by the commissioners, probably will be submitted to the voters at that time.

Wage Agreement Renewed, Slightly Modified

A new wage agreement has gone into effect on the United Railways, St. Louis, Mo., Rolla Wells, Receiver, affecting about 5,000 employees, members of the Amalgamated, retroactive to Jan. 1. Motormen and conductors retain the old scale of 50 cents an hour for the first year, 55 for the second, 60 cents for the third, and 65 cents an hour after the third year. Time and a quarter for overtime also remains in effect.

The new contract runs until July 1, and thereafter it may be terminated by either side on thirty days' notice. This arrangement is made by the management in view of the probability of getting a decision from the Missouri Public Service Commission in the valuation case now pending. The present 7-cent fare is to continue in effect until June 30.

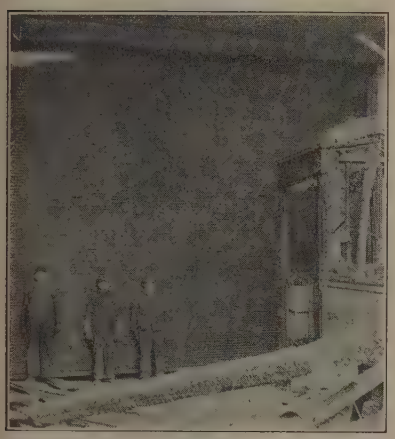
The union representatives made a fight for a return to old working conditions under which men on trailer runs were allowed a minimum of eight hours. Under the new agreement the minimum is six hours. The union representatives also contended for time and a half overtime but this was not allowed.

Although the union has ratified the agreement in principle, all of the details have not been worked out and the formal signing of the contract may not take place for several days.

$1,000,000 Fire Damage

Ninety Cars Were Lost by the Chicago Surface Lines in Devon Carhouse on Jan. 26

Fire destroyed half of the Devon Avenue carhouse and seventy-eight passenger cars belonging to the Chicago Surface Lines on Jan. 26. Besides twelve miscellaneous service cars were lost. The intervention of steel rolling shutters between two sections of the carhouse saved ninety other cars and the portion of the building devoted to station headquarters. The loss was about $1,000,000. The building and its contents were covered by insurance.



STEEL SHUTTERS WHICH PREVENTED SPREAD OF THE FIRE

The blaze was discovered about 3 o'clock in the morning and within a short time the structure, which was about twenty years old, was a mass of flames. The building was rectangular in construction, about 100 by 1,000 ft., with the principal exit at one end. It was feared that a total loss would result, but the employees succeeded in lowering the rolling doors. This confined the flames to the rear half of the structure. All cars in the rear section were destroyed. The heat was so intense that the metal doors became white hot and some cars on the side of the doors opposite to the fire were scorched by the intense heat of the burning section.

Most of the cars that were destroyed were comparatively new. Some of them, however, were built as long ago as 1908, but some had been constructed as recently as six months ago. The latter included nine of the new trailers. Fourteen re-built motor cars converted to haul trailers were also lost. The miscellaneous equipment destroyed included four sprinklers, three sweepers and two snow plows. The Surface Lines own about 3,200 passenger cars, scattered among sixteen stations. Prompt work on the part of the officials resulted in gathering sufficient of the surplus equipment to the Devon Avenue station so that full service was given in the morning rush hours on the lines affected.

FLAMES CONFINED TO INTERIOR

The roof of the carhouse was of mill-proof, slow burning construction supported by steel girders. This confined the flames to the interior and they spread rapidly from car to car. The electric current was cut off shortly after the fire started. This put out the lights and made it difficult to move the cars, but automobile trucks were secured and a number of cars were taken out the front half of the building before the flames were checked. The debris was cleared away after a few days and it was announced that the burned portion of the carhouse would be used at least temporarily for open storage of cars.

LOOKING SOUTHEAST, SHOWING PART DESTROYED AND REMAINING PORTION OF CARHOUSE AFTER CHICAGO FIRE

Jitneys Defeated in Kenosha

At a referendum election held on Jan. 24 at Kenosha, Wis., the proposition to permit jitneys to operate on the streets of the city was voted down 4,256 to 2,415. Out of nine city wards, the jitneys carried only one. At the same time Kenosha adopted the city manager form of government by a majority of 872.

ROOF GIRDER RESTING AGAINST CAR

The street railway service in Kenosha is being operated by the Wisconsin Gas & Electric Company, a subsidiary of the North American Company. When this company learned that the jitney proposition was to be put to a referendum vote, it at once petitioned the Wisconsin Railroad Commission for permission to abandon railway service in Kenosha should the referendum go in favor of the jitneys.

Some years ago when the jitneys were allowed to operate in Kenosha without any restriction or supervision, the company suspended railway service for forty-five days, with the result that an ordinance was passed regulating jitney operation. Since that time one-man equipment has been introduced in Kenosha. The cash fare there is 7 cents and the ticket fare eight for 50 cents, but an unlimited ride weekly pass is sold for $1.

Shortly before the referendum the company proceeded to inform the public of its attitude on the question, pointing out conditions under which the railway is now being operated and the consequences of permitting unrestricted jitney operation. Newspaper advertising space was freely used by both sides in the campaign.

Kenosha is a city of 40,000 population located about 30 miles from Milwaukee. It is between that city and Chicago.

Governor Miller Favors 5-Cent Fare

Tells Merchants He Thinks It Practicible for New York—Appointed Present Commission

The 5-cent fare in New York will be preserved, in the judgment of Governor Miller. This statement was made at an address on Jan. 26 to the Merchants' Association. The Governor took occasion also to explain the reasons which led him to appoint the present Transit Commission, and he invited the co-operation of the city government in the work of the commission.

The Governor said he had no word of criticism for the city administration in taking the Transit Commission act to the Court of Appeals in order to test its legality and based his appeal for a cessation of the fight upon the recent decision of that tribunal upholding its constitutionality. He explained he had favored the Transit Commission law because, upon assuming office, he found that the public was getting less service than for years and the problem had become "the football of politics." Continuing, the Governor said, in part:

If nothing was done I foresaw a situation in this town five years hence, we will say, which to me was appalling, because you know there is a daily increase in travel on the transit lines of this center of 4,000—4,000 more people will ride to-day than did yesterday and 4,000 more will ride to-morrow than did to-day.

Now stop and think what that means—no provision whatever to take care of it. I found it was essential to break the deadlock if we were to get any progress, which for years had existed between the Board of Estimate and the State officials, and, mind you, those officials were all of the same political party.

It was necessary, in my judgment, that the solution of the problem should be vested in a board which possessed the regulatory powers of the State, which have never been delegated to the city. There has been a great deal of talk about the power to modify city contracts. They needed modification in the respect that the companies had advantages under those contracts which they needed to surrender in the public interest. No modification was contemplated requiring the city to give up anything. There was nothing new in anything that was done or in the exercise of any legislative powers that were exercised. Some of the people of this community seem to have forgotten that these very contracts were made in the name of the city by a State body—the Public Service Commission.

Now I take it that the bogey of the 8-cent fare has served its purpose. We still have with us the myth of the 5-cent fare. I say myth, because anybody who rides about this town knows that instead of a 5-cent fare the people are required to pay 7 and 12 and 15 and 17 and even 20 cents for wholly inadequate service. And what you were doing here by clinging to this myth of the 5-cent fare was to make it more likely every month that you would'nt be able to ride at all. What this town needs first of all is service.

And I want to say to you also, in my judgment, the 5-cent fare can be preserved. In my judgment it will be preserved. It will be preserved by establishing a just rule to govern the problem, not on any theory you can get something for nothing—not on the theory that the people will be carried for less than it costs to carry them, including a proper return on the honest capital—and I emphasize "honest"—that is used in their service. You can never extend your transit facilities unless you recognize that principle. If you apply it honestly and impartially all the evidence indicates you can get adequate extensions of transit facilities, and by the elimination of unnecessary waste and cost you can preserve, in all probability, the 5-cent fare.

The City of New York is confronted with a situation that its borrowing capacity is now frozen in from $250,000,000 to $300,000,000 of subway bonds, the interest on which and the amortization of which are now being provided by the taxpayers of the city. Unless that frozen credit can be released, the city of New York has not sufficient borrowing capacity to secure needed extensions of your transit facilities or to undertake the vast other public works that are now crying for further expenditure of money. Now, that is the problem. It is in the hands of three gentlemen whom I selected, residents of this community, and I thank God that I was able to find three such public-spirited citizens who were willing to devote their time and talents to the service of this community.

Two of them happen to be Democrats and one a Republican. That was merely a coincidence, because I selected these gentlemen wholly regardless of their politics. I looked for the men whom I thought best fitted to solve this problem and I think that every day that goes by the people of this community are learning more and more that a wise selection was made.

Franchise Proposals Popular in Fox River Valley

Franchise proposals are the thing in Aurora and Elgin, Ill., and in other cities in the Fox River valley served by the Aurora, Elgin & Chicago Railroad, and the Elgin & Belvidere Electric Railway. Following the franchise framed by the Elgin City Council, which was discussed in the ELECTRIC RAILWAY JOURNAL for Jan. 14, page 87, B. P. Alschuler, counsel for Joseph K. Choate, receiver for the Aurora, Elgin & Chicago line, presented to Judge Evan A. Evans of the United States District Court, franchises for cities which the line serves. He has prepared one for Aurora, one for Elgin, and one for the other cities in the Fox River Valley which the line taps. Within a few days, Bion J. Arnold, president of the Elgin & Belvidere Electric Railway, submitted a franchise to Mayor Arwin E. Price for consideration by the commissioners.

The first franchise, that of the Aurora, Elgin & Chicago company, provided that the traction company would be liable for no costs of paving, although it will repair streets injured by the company cars. No provisions were made regarding fares, since Attorney Alschuler believes that this does not lie within the province of the cities, but is a matter reserved for the Public Utilities Commission. Under the proposed franchise, the company would have the right to operate over its lines in the city the cars of the interurban companies which feed the city. It would also have the right to use overhead distribution storage battery, and gasoline, kerosene or other materials for motive power. In other respects the franchises correspond to the previous ones in effect.

The franchises are asked in the name of the Aurora, Elgin & Chicago Rail-Electric Company, the name of the reorganized Fox Valley lines.

The franchise presented by Mr. Arnold is for Elgin. It provides for a 5-cent fare during certain hours, a straight 10-cent fare for the casual rider, and a 7-cent fare for the purchaser of twenty-four tickets. Mr. Arnold has planned to run his cars into Elgin over the tracks of the Aurora, Elgin & Chicago Railroad if arrangements can be made.

Storm Worse Than Strike

Unprecedented Snow Fall at Richmond Hampers Company Seeking to Restore Service After Strike

Interest in the railway strike in Richmond, Va., has been almost completely overshadowed by the unprecedented snow storm of Jan. 27 and 28. All traffic was suspended until late Sunday afternoon and on Feb. 1 the streets were still piled high with snow. Steam shovels of the department of public works cleared some of the principal business streets, but all forms of travel to the suburbs are still much handicapped.

With less than half its normal force of motormen and conductors, the Virginia Railway & Power Company, which had been tied up in Richmond and on its interurban line by a strike, began on the afternoon of Jan. 28 to dig out its main lines. Forces of motormen and conductors in uniform—men hired since the strike began, worked in gangs picking ice from the tracks where vehicle traffic had packed it tight, and by Monday morning a partial service was resumed on the Broad Street and the Main Street lines.

ALL LINES SOON OPEN

General Manager Harvell announced on Feb. 1 that notwithstanding strike and weather conditions, there were seventy-one cars in operation, the average number in normal times exclusive of rush hours being ninety-eight. Five lines remain without service. It may be the end of the week before all of these can be opened as extensive snow drifts are still to be cut in some places. As fast as additional men can be obtained the service will be increased during the rush hours on the principal lines now in operation. Full service has been resumed on the interurban line and in Petersburg.

An agreement has been reached in Norfolk between City Manager Ashburner and President Wheelwright to compromise on a 6-cent fare.

The Richmond Board of Aldermen planned to meet on Feb. 1 to consider concurrence in the action of the Common Council reducing the fare from 6 to 5 cents in Richmond, as a reprisal against the company for its wage cut and refusal to arbitrate.

The company takes the ground that the strike is over, and that but for the storm all lines would now be in normal operation. Experienced men are being employed, and the patronage of the cars now in operation is increasing.

COMPROMISE AGREEMENT EFFECTED

Pending negotiations for a compromise of the strike the Board of Aldermen on the night of Feb. 1 deferred action on the reprisal ordinance reducing car fares from 6 to 5 cents as a penalty to the Virginia Railway & Power Company for its refusal to arbitrate the strike. With the rapid thaw of snow the streets are clearing and service is being restored by the company on nearly all lines.

A conference was set to be held on Feb. 2 to be attended by three representatives of the strikers, three from the company and three from the Board of Aldermen.

NEW WAGE SCALE FIXED

The company has agreed to take back as many men as it needs to fill vacancies, at the rate pay to be 35, 37½ and 40 cents an hour according to seniority, with 5 cents an hour extra for one-man car operation. This is practically the scale against which the men struck and at which the company has since been employing men, the concession being that those who come back at once may retain their seniority and come back as old men and not have to be re-employed as new men at 30 cents an hour. The company has been hiring men of previous experience on other roads on the basis of one year experience. If the negotiations looking toward a settlement of the strike are successful the city is to regulate jitneys, take prompt action on a request for a trolley bus franchise and continue the 6-cent fare for the present.

An agreement has been reached in Norfolk to reduce fares from 7 to 6 cents. The wage arbitration in Norfolk has resulted in a report for a scale of 35 cents an hour for first-year men, 39 cents for second-year men and 42½ cents for third-year men. Service in Norfolk is declared to be normal.

Wireless Comes to Rescue

After all forms of its wire communication had failed the Monongahela Power & Railway Company, Fairmont, W. Va., resorted to wireless to operate its cars and give instructions to its repair crew to mend its breaks occasioned by a recent blizzard. Edward C. Jones, Jr., who, with a couple of companions, operates a wireless set at Fairmont, went to the rescue of the traction officials. He was able to pick up Clarksburg, and immediately upon receipt of this information Capt. L. W. LaMar, manager of the power department of the company, established headquarters in the wireless office and dictated instructions to his superintendents in Clarksburg.

Through the agency of the wireless it was possible for the company to get a 20,000-volt, high-tension feeder working from the Rivesville plant into Parkersburg, supplying sufficient power to bring in the stranded interurban trains caught out on the Clarksburg line when the 66,000-volt feeder went out of commission.

Three-Cent Wage Reduction in Dayton

Wage reductions have been ordered by the Dayton (Ohio) Street Railway which will affect about forty employees. The new scale will be 41, 43, and 45 cents an hour. The old scale was 44, 46, and 47 cents an hour. The People's Railway had previously reduced its wages.

Taxpayers' Suit Heard

Court Takes Under Advisement Plea to Prevent City Dipping Into General Fund to Help Railway

In Superior Court before Judge J. T. Ronald, the "Fourteen Taxpayers" suit, in which taxpayers of Seattle, Wash., are seeking to enjoin the city of Seattle from using general tax funds for the support of the Municipal Railway was recently tried. Judge Ronald took the matter under advisement.

In the opening testimony, attorneys for the taxpayers outlined past fiscal policies of the corporate authorities with respect to the Municipal Street railway, which indicate danger of invasion of the general tax fund to pay for the maintenance and operation of the traction system in the future. Specific instances were quoted.

The position taken by the fourteen taxpayers in seeking a permanent injunction against the invasion of the general fund for the railway was briefly outlined by counsel for the plaintiffs. In presenting the case counsel said:

> We expect to prove that at the time of the bringing of this action last February the city had taken $83,000 from the general fund for the railway. We contend that this money was illegally taken from the general fund, and that this is sufficient justification for our suit. Also, on account of lack of money to meet the interest on the bonds, warrants were issued while the railway was on a warrant basis, amounting to many thousands of dollars.
>
> During 1918 and 1919 the revenues were not nearly enough to pay for the operation and maintenance of the utility, and the same thing was true as to the year 1920. At the time our action was brought, this was only estimated as to 1921, but we can now show the standing of the railway up to 1921.

Attorneys for the taxpayers also submitted testimony in the form of a report prepared last January for Mayor Hugh M. Caldwell, showing departmental expenditures of approximately $1,250,000 from general tax funds for the benefit of the Municipal Railway during the years 1919 and 1920, and an estimated expenditure of approximately $720,000 from the same source for the year 1921, a total of almost $2,000,000.

Attorney Donworth, for the city, stated that the general fund is not in imminent danger of invasion for the railway, and that the traction system shows every prospect of standing on its own feet on the present 8½-cent fare, and of paying its obligations of principal and interest and maintenance and operation without resorting to taxation for support.

In the suit of the Puget Sound Power & Light Company to compel "specific performance" by the city of Seattle under the contract by which the city bought the company's railway system, Federal Judge E. E. Cushman on Dec. 19 handed down a memorandum decision ordering the plaintiff's form of decree entered as the ruling of the court. The form of decree was in part as follows:

> If the gross of revenues received are sufficient to pay the charges expressly provided in the bonds to be superior to the bonds, but are not sufficient to also pay the bonds with interest by or on March 1, 1939, payable in the manner and at the times herein before decreed, and the cost of maintenance and operation, then the city shall pay such cost of maintenance and operation out of its general fund or any fund available and cannot legally and permanently divert such gross revenues from such special fund created for the payment of the principal and interest of such bonds to the payment of cost of operation and maintenance.
>
> The city shall, out of its general fund or from some other available source, other than the gross revenue of the system, pay the cost of operation and maintenance, when not doing so will cause operation of the system or some part thereof to cease or deprive the owner of any bond issued under Ordinance 39025, of any part of the gross revenues of the sysem pledged to the special fund for the payment of the principal and interest of such bonds as herein decreed.

The decision was based largely on the opinion of the State Supreme Court, in the case of Twichell against the city of Seattle, the "friendly" suit in which the validity of the railway purchase was involved.

In ruling on the Puget Sound Power & Light Company's alleged prior claim to the gross revenues of the railway, Judge Cushman in his decision said:

> The question of complainant's claim on the gross current income for the payment of the installments of principal and interest, next falling due, is not only indirectly involved because of the necessity of its consideration in order to determine the question of default upon failing to pay into the special fund, thirty days prior to the due date; but it would appear to be directly put in issue by any refusal of the city to disclaim, confess or deny the priority of complainant's right to such gross revenue and fund. Complainant, by its bill, asserts its priority of right to the gross revenue and, in effect, pleads that, by the decision in the Twichell case it was determined that to preserve complainant's priority right in the gross revenue, the city would, if such revenue were "insufficient to meet all charges, be compelled to pay the cost of maintenance and operation by taxation or from other sources than the revenue of the property."

New Subsidiary Organized by New Jersey Corporation

The Public Service Production Company has been incorporated in the interest of the Public Service Corporation of New Jersey. It is explained that the purpose of the Public Service Corporation is to broaden its field of usefulness. The new company will be an engineering organization. It will be separate from the operating companies, confining the work of the latter to operating, pure and simple. The new company will be prepared to undertake engineering and construction work for governmental agencies, public utilities and corporations generally.

Thomas H. McCarter, president of the Public Service Corporation, said:

> There is a very large field for electric engineering and development throughout the country, a part of which the new company hopes to fill. It will also be prepared to do valuation work for public utility and industrial corporations. It also proposes to embark in the paving business upon a substantial scale. The United States Government, the various states and municipal divisions thereof, are spending and propose to spend vast amounts of money in paving, and we are of the opinion that there is room in the business for a substantial corporation which will do first-class work at fair prices.

The charter is extremely broad with respect to the activities in which the new company may engage. The papers of incorporation show that $5,000,000 of preferred stock will be issued, paying 8 per cent cumulative dividends. There will also be issued 50,000 shares of common stock of no par value.

Financial and Corporate

$290,000,000 P. R. T. Value at 1919 Prices

The total valuation of the property of the Philadelphia (Pa.) Rapid Transit Company, as stated by that company, is $290,000,000. That was developed on Jan. 26 at the hearing in the valuation proceedings before Public Service Commissioner Clement when W. K. Myers, of the company's valuation committee testified that the going concern value was $38,000,000.

Mr. Myers in his testimony defined going-concern value as the value that exists in a complete, matured and successfully operated property with a built-up business attached as compared with a new property which is in that immure condition usually prevalent at the beginning of its operation. It includes the added value to a property usually attendant upon the consolidation of many plants into one efficient organization, the benefit of which should be reduced cost of operation and improved service He said that it also includes the added value to a property because of the development of the physical property, the management and business.

The witness explained that the $38,000,000 amounts to approximately 15 per cent of the reproductive cost as of June 30, 1919. He maintained that his estimate should be added to any base figure which the commission may decide upon as being the proper reproductive cost to use in the determining fair value.

Indiana Property for Sale

Sale of the property of the Lafayette (Ind) Service Company has been ordered in a decree issued by Judge A. B. Anderson in United States Court. The decision was reached at a hearing in the foreclosure suit filed against the company by the Real Estate Trust Company, Philadelphia, representing the holders of $225,000 of bonds. Judge Anderson directed that the decree of sale provide for disposal of the company's property in such a manner as to bring the largest return. The property is to be sold within forty days of the decree and will be offered first as a unit and if not sold then in parcels. The plaintiff will ask Charles Martindale, master in chancery, to set Feb. 18 as the date for the public sale.

One of the bidders for part of the property will be the Northern Indiana Gas & Electric Company, according to W. A. McInery, of South Bend, Ind., counsel for the company. Mr. McInery said his company wished to buy the electric railway's power plant in order to supplement the electric service now given to the city of Lafayette by the Northern Indiana Gas & Electric Company. Mr. McInery indicated that his company would buy the company's property as a unit, if necessary, but that it had no desire to operate the railway system. He said in such an event his company would endeavor to interest Lafayette capital in the development of the electric railway service.

He said that the company was not making any money as now operated by a receiver and that it was thrown into the hands of the receiver largely as a result of competition from jitneys. He said, furthermore, that capital sufficient to operate the system could not be interested in the venture so long as the jitneys were permitted to run without regulation.

Interest Charges in Seattle Will Be Decreased Considerably in 1922

Interest charges on the $15,000,000 bonds issued to Stone & Webster in payment for the Seattle (Wash.) Municipal Street Railway will be decreased in the fiscal year 1922 by $41,650, bringing the annual payment of interest on these securities down to $708,350. This will result from the payment on March 1 of the first $833,000 annual instalment of the principal of the $15,000,000 debt. The annual interest charge for 1921 was $750,000.

Figures prepared by City Comptroller H. W. Carroll show that in 1921 the accumulated deficit of the electric railway was reduced by approximately $160,000. The net profit for the eleven months ending Nov. 30 was $130,588. The profit for December has not yet been figured, but as it was a prosperous month for the railway, the accountants estimate the gain of revenues over operating costs during the last thirty-one days of 1921 at about $30,000, making the year's total profit about $160,000.

This means, the accountants point out, that the railway not only did not incur any further deficit during the year, but instead reduced the deficit which was on the books at the beginning of the period. During 1920, there was no profit, but a loss of $1,236,239. The total deficit at the beginning of 1921 was $1,184,163. Of this $1,177,696 was a charge for depreciation of the system, or the amount which should have been set aside or else expended in betterments and replacements to keep its values the same as when it was appraised in 1918 at $15,000,000.

The accountants pointed out that if this depreciation charge were ignored, the railway would have had a surplus of $118,031 in its treasury on Nov. 30, 1921, when the depreciation charge had increased to $1,801,607. In 1921, with a profit of approximately $160,000, the deficit was cut from $1,814,163 to approximately $1,653,576.

Petition for Appointment of Receiver Withdrawn

Clarence H. Venner, who as president of the General Investment Company and the Continental Securities Company, brought suit in equity on Aug. 27 in the Federal District Court at New York to place the Interborough Rapid Transit Company in receivership, withdrew the application when the hearing on the petition was resumed on Jan. 3, before Judge Julius M. Mayer of the United States Circuit Court of Appeals. Venner, through his attorney Elijah Coline, said that he withdrew the action in view of his belief that the situation has changed since institution of the proceedings.

The petitioners claimed when the suit was instituted they actually believed that a great crisis existed in connection with the financial affairs of Interborough Rapid Transit and did not believe that it would be possible to obtain an extension from the holders of the defaulted bonds.

The petitioners held, however, that despite belief that the crisis had passed great danger still remains and they asked the court for permission to file an interrogatory which would permit renewal of the application if the situation demanded.

James L. Quackenbush, attorney for the Interborough, in explaining the situation said he desired to have it understood that the petition was voluntarily withdrawn by the plaintiff and not on the request of the company. He added that although the petitioners' attitude in the proceedings was most gratifying he would not consent to withdraw motions made at previous hearings on behalf of the Interborough to dismiss the application in view of the plaintiff proposing to file an interrogatory.

San Francisco Committee to Take Up Market Street Railway Purchase

The public utility committee of the Board of Supervisors of San Francisco, Cal., on Jan. 18 appointed a committee to negotiate with the Market Street Railway as to the proposed purchase of the properties and the plan of submitting a proposition to the voters of San Francisco.

The committee is composed of Mayor James Rolph, City Engineer M. M. O'Shaughnessy, City Attorney George Lull and five members of the Board of Supervisors.

Three points are to come up for consideration in the preliminary conferences. These are (1) whether the company will sell on the "pay-as-you-go" basis, which was provided for in a charter amendment relating to the purchase of public utilities by the city and passed by the voters on Nov. 2, 1920; the idea being that the utility would be paid for out of its own earnings, (2) at what price the company will sell and (3) whether San Francisco would have to guarantee certain sums in annual payment.

$1,117,621 Profit in Boston

From an Accumulated Operating Deficit of $5,000,000 in 1919 Road Has Been Established on Self-Supporting Basis Under Public Trustees

After making allowance for delayed charges and credits applying to the operations of previous years the receipts of the Boston (Mass.) Elevated Railway for the calendar year ended Dec. 31, 1921, exceeded the cost of service by $1,117,621. In the preceding calendar year the cost of service had exceeded receipts by $346,951. On Dec. 31, 1920, there were also outstanding deficits carried over from the year 1919 that amounted to $459,007. These obligations totaling $805,959 have been met and $311,661 paid into the reserve fund as required by law.

THESE facts together with other details of operation for the year just ended are contained in the third annual report of the board of trustees of the company made to the Massachusetts Senate and House pursuant to the Special Act of 1919.

Three years and a half have elapsed since the trustees took charge. At the end of the first year during which a 5, then a 7 and finally an 8-cent fare was in force an operating deficit of approximately $5,000,000 had accumulated which was met from the reserve fund and general taxation in the cities and towns served by the railway. In the second year with a flat 10-cent fare in force revenue practically met expenses. In the calendar year just closed, as already stated, receipts exceeded expenditures by approximately $1,117,000.

TRAFFIC STATISTICS OF BOSTON ELEVATED RAILWAY FOR YEAR ENDED DEC. 31.

	1921	1920	1919
Round trips operated	5,778,881	5,770,692	6,588,226
Passenger revenue	$32,253,629.59	$33,108,946.48	$28,767,544.11
Passenger revenue per car-mile; cents	64.89	64.62	53.74
Passenger revenue per car-hour	$7.361	$7.155	$6.057
Passenger revenue mileage	49,706,697	51,237,527	53,533,522
Passenger revenue car-hours	4,381,815	4,627,295	4,749,318
Revenue passengers carried	337,252,080	335,526,561	324,756,635
Revenue passengers carried per car-mile	6.785	6.548	6.066
Revenue passengers carried per car-hour	76.97	72.51	68.36

Increase in Passenger Traffic Despite Depression

Notwithstanding the general lessening of traffic upon railroads and railways which began with the industrial depression last spring on the Boston Elevated there has been an increase in number of passengers carried. The public trustees in charge of the affairs of the company attribute this as due in large measure to the experimental operation of 5-cent surface lines for short distance travel without transfer. The number of passengers now riding for a 5-cent fare is 18 per cent of the total riding. With the establishment of additional lines to be in operation within this and next month the number will undoubtedly exceed 20 per cent of the total riding. This limited local service adds to the usefulness of the railway without imposing material burden upon those who pay the basic 10-cent fare.

The trustees say that this experiment with this service has attracted the attention of transportation experts in many large cities and that "it may well lead to the adoption of some plan for a general reduction in fares upon an equitable distribution of the charge for riding."

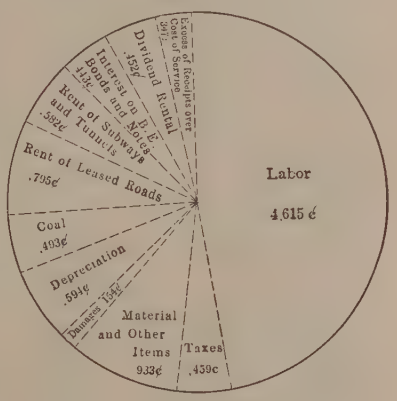
The operating costs of 1921 reflect lower prices of coal and materials, decrease in wages, the less severe conditions of the winter season and changes that have promoted efficient operation. The division of expenditures is graphically shown in the accompanying chart.

The power plant has been improved through installation of new equipment such as air compressors, soot blowers, reactance coils, air washers, feed pumps and rotary converters. Fewer tons of coal have been burned during the last year than in any of the years given in the accompanying comparative table showing the price of coal per ton and the unit of efficiency of the coal that was burned:

During the year 27.242 miles of track were constructed and 13.88 miles improved by extensive repairs. One hundred and five modern center entrance cars were received and placed in service and forty-six of the sixty-five steel cars ordered to replace an equivalent number of wooden cars in use on elevated lines were received. Several large snow ploughs have been added to the equipment. The list of useless equipment has been lessened by the disposal of obsolete cars, snow ploughs, trucks and other miscellaneous equipment.

The terminal yard at Forest Hills has been completed and the operation of trains from this yard began on Nov. 9. The trustees explain that this means efficient operation of the main line, reduces the likelihood of serious results should the Charlestown Bridge become disabled and annually lessens operating costs by eliminating nearly 1,000,000 miles of dead mileage.

12 Months Ending December 31, 1921
Average Receipts per Revenue Passenger 9.867¢



ALLOCATION OF RECEIPTS PER PASSENGER

Important Rapid Transit Projects Pending

Two exceedingly important and far reaching changes in rapid transit are now pending. One involves virtually a new transit thoroughfare for the operation of three-car trains from a terminal at Braves' Field, Allston, through the Boylston and Tremont Subways and over the East Cambridge Viaduct to Lechmere Square, Cambridge, where a new terminal is being constructed. This change will substitute one large unit for several small units and through the use of trains with additional cars will mean more frequent, rapid and regular service that will materially relieve the congestion in the subway. The other change is that proposed in the lines operating on Huntington Avenue through the substitution of train for single car service. According to the trustees these two improvements furnish the only known way of relieving the congestion in the Tremont Street Subway until a permanent remedy is

COMPARATIVE PASSENGER STATISTICS
REVENUE PASSENGERS CARRIED

Year	Week-Day Average	Saturday Average	Sunday Average	Holiday Average	Total for year
1915	992,283	1,140,046	685,726	846,860	352,469,586
1916	1,050,038	1,218,749	718,804	832,962	373,577,908
1917	1,073,943	1,249,588	728,847	857,902	381,017,338
1918	985,384	1,147,809	658,902	775,634	348,664,700
1919	934,918	1,078,635	596,182	706,429	324,758,685
1920	960,737	1,072,319	591,063	703,634	335,526,361
1921	975,745	1,068,295	578,860	696,691	337,352,080

COAL COSTS OF BOSTON ELEVATED RAILWAY.

	1921	1920	1919	1918	1917	1916	1915
Tons of coal burned	215,870	258,087	287,670	281,677	270,452	254,735	244,912
Pounds of coal per kilowatt-hour	2.174	2.353	2.835	2.772	2.309	2.256	2.321
Average price of coal per ton	$7.71	$10.07	$5.91	$6.26	$4.19	$3.35	$3.39
Net cost of power for car service per kilowatt-hour, cents	1.172	1.921	1.307	1.158	.620	.534	.517
Net cost of power per total revenue car-mile, cents	4.815	8.538	5.439	4.668	2.573	2.137	1.972

BOSTON ELEVATED RAILWAY
INCOME STATEMENT

OPERATING INCOME	12 mos. ending Dec. 31, 1921	12 mos. ending Dec. 31, 1920	12 mos. ending Dec. 31, 1919
Passenger revenue	$32,237,396.47	$33,096,763.69	$28,752,675.38
Special car revenue	16,233.12	12,182.79	14,868.73
Mail revenue	578.98	737.10	722.24
Express revenue	44,154.94	88,657.99	89,002.98
Miscellaneous transportation revenue	3,838.20	4,383.17	3,001.85
Total revenue from transportation	$32,302,201.71	$33,202,724.74	$28,860,271.18
Station and car privileges	$305,937.96	$300,228.32	$293,871.62
Rent of tracks and facilities	26,051.00	39,059.11	41,477.2
Rent of equipment	1,659.83	1,644.27	5,209.40
Rent of buildings and other property	111,951.20	100,499.45	82,514.36
Power	84,932.67	92,192.00	46,349.33
Miscellaneous	20,318.76	14,514.61	74,898.45
Total revenue from other railway operations	$550,851.42	$548,137.76	$544,320.41
Total railway operating revenues	$32,853,053.13	$33,750,862.50	$29,404,591.59
Railway operating expenses:			
Way and structures	$3,021,844.18	$3,226,275.11	$3,783,715.35
Equipment	4,470,357.23	4,033,850.42	4,290,039.81
Power	2,532,500.73	4,568,991.90	2,980,658.59
Conducting transportation	10,752,382.64	11,524,823.18	10,530,882.29
Traffic	2,401.23	3,357.91	4,758.03
General and miscellaneous	2,063,570.98	2,411,823.59	2,110,285.34
Total railway operating expenses	$22,843,056.99	$25,769,122.11	$23,700,339.41
Per cent. of operating expenses to operating revenues	69.53	76.35	80.60
Per cent. of operating expenses to operating and non-operating income	68.65	75.72	80.34
Net revenue, railway operations	$10,009,996.14	$7,981,740.39	$5,704,252.18
Taxes assignable to railway operations	1,546,758.15	1,142,987.28	1,045,502.37
Operating income	8,463,237.99	6,838,753.11	4,658,749.82
NON-OPERATING INCOME			
Income from lease of road	$823.40	$823.40	$823.40
Dividend income	9,180.00	9,180.00	9,180.00
Income from funded securities	4,503.41	6,356.89	6,280.50
Income from unfunded securities and accounts	375,158.65	233,379.60	42,853.06
Income from sinking fund and other reserves	33,280.00	28,853.33	33,280.00
Miscellaneous income	1,026.94	2,180.72	1,565.27
Total Non-operating income	$423,972.40	$280,773	$94,991.23
Gross income	$8,887,210.39	$7,119,527	$4,752,741.05
DEDUCTIONS FROM GROSS INCOME			
Rent for leased roads:			
West End Street Railway	$2,630,780.24	$2,590,258.15	$2,540,892.94
West End Street Railway—Tremont Subway	182,512.32	177,686.09	176,545.11
Other roads	48,914.48	48,303.71	57,793.99
Total rent for leased roads	$2,862,207.04	$2,816,247.95	$2,775,232.04
Miscellaneous rents	$1,781,225.46	$1,612,746.21	$1,339,501.90
Net loss on miscellaneous physical property	6,959.96	9,325.77	7,986.10
Interest on funded debt	1,292,800.00	1,307,018.75	1,309,477.08
Interest on unfunded debt	201,458.43	207,945.23	246,312.98
Amortization of discount on funded debt	31,468.08	34,860.38	44,290.46
Miscellaneous debits	16,279.55	14,881.50	8,070.37
Total deductions from gross income	$6,192,398.52	$6,003,025.79	$5,730,870.93
Net income transferred to credit of profit and loss	$2,694,811.87	1,116,501.26	*978,129.88*
Proportion of dividends	1,523,367.00	1,463,668.50	1,403,970.00
Balance after cost of service	$1,171,444.87	*$347,167.24*	*$2,382,099.88*

Note—Figures in italics indicate deficits.

BOSTON ELEVATED RAILWAY
OPERATING EXPENSE ACCOUNTS

WAY AND STRUCTURES	1921	1920	1919
Superintendence of way and structure	211,850.11	194,428.55	189,806.92
Maintenance track and roadway (except snow and ice)	1,724,134.42	1,162,612.96	2,784,370.28
Removal of snow and ice	63,460.07	615,548.70	18,549.67
Roadway structures	96,630.14	79,253.48	78,838.28
Signal and Telegraph and Telephone lines	23,370.33	45,728.82	40,125.98
Other miscellaneous way expenses	14,012.13	19,163.99	80,608.36
Maintenance for electric line equipment	278,348.00	264,490.05	251,258.31
Maintenance of buildings, fixtures and grounds	335,038.98	348,048.56	296,957.55
Depreciation of way and structures	275,000.00	17,000.00	43,200.00
Total way and structures	$3,021,844.18	$3,226,275.11	$3,783,715.35
EQUIPMENT			
Superintendence of equipment	142,844.54	136,169.08	130,546.65
Maintenance of cars	1,640,767.49	1,699,568.11	1,550,450.88
Maintenance of electric equipment of cars	628,477.20	804,309.30	593,667.37
Shop expenses	275,822.05	326,959.57	272,509.31
Miscellaneous equipment, vehicles, horses, etc	53,445.95	44,844.36	38,545.60
Depreciation of equipment	1,729,000.00	1,022,000.00	1,704,320.00
Total equipment	$4,470,357.23	$4,033,850.42	$4,290,039.81
POWER			
Superintendence of power	79,834.66	85,059.57	78,597.01
Maintenance of power plants	337,746.70	457,635.12	328,835.05
Depreciation of power plant buildings and equipment	.....	965,000.00	256,480.00
Operation of power plants	2,114,919.37	3,061,297.21	2,316,746.53
Total power	$2,532,500.73	$4,568,991.90	$2,980,658.59
CONDUCTING TRANSPORTATION			
Superintendence of transportation	990,478.82	1,008,465.02	870,231.52
Passenger conductors, motormen and trainmen	7,041,863.84	7,646,971.90	6,858,788.30
Freight conductors, motormen and trainmen	12,150.78	15,715.67	20,450.89
Miscellaneous car service employees	311,922.91	296,455.06	267,635.58
Miscellaneous car service expenses	155,427.67	206,948.02	236,186.71
Station employees	720,736.44	735,178.90	819,994.25
Station expenses	183,938.93	219,632.87	199,113.10
Carhouse employees	873,312.15	920,926.65	859,285.35
Carhouse expenses	59,941.20	75,141.23	75,298.44
Operation of signal and telegraph and telephone lines	221,537.17	214,559.69	168,891.80
Other transportation expenses	181,072.73	184,828.17	155,006.35
Total conducting transportation	$10,752,382.64	$11,524,823.18	$10,530,882.29
Traffic	2,401.23	3,357.91	4,758.03
GENERAL AND MISCELLANEOUS			
Salaries and expenses of general officers and clerks	412,724.08	408,825.79	389,588.64
General office supplies and expenses	81,760.91	198,992.05	78,026.75
Law expenses	62,180.47	35,941.44	20,142.84
Relief department expenses, pensions and graituities	60,291.17	43,837.44	34,743.75
Miscellaneous general expenses	75,270.56	75,865.97	68,941.20
Injuries and damages	665,798.02	785,971.56	830,663.98
Insurance	287,406.21	372,849.38	274,052.74
Stationery and printing	92,120.81	108,569.70	82,991.60
Store, garage and stable expenses	286,504.07	350,969.92	294,184.04
Rent of tracks and facilities	24,212.73	13,998.99	13,789.55
Rent of equipment	15,301.95	16,001.35	23,160.25
Total general and miscellaneous	$2,063,579.98	$2,411,823.59	$2,110,285.34
Total operating expenses	$22,843,056.99	$25,769,122.11	$23,700,339.41

provided through the enlargement of the facilities which this subway affords. In conclusion the trustees say:

In the return to a better financial footing with assurance of ability to procure sufficient revenue to meet the costs of service the trustees welcome the opportunity to deal more liberally with questions of accommodation for the public and less attention to drastic measures aimed merely at economies. It is now possible without abandonment of business methods or disregard of economies that make for efficient service to decide upon the merits, requests involving additional usefulness and larger convenience for the car riding public.

Recommendations for legislation have been duly filed in accordance with law and now appear as Public Document House No. 63. One of them relates to the issue of bonds to provide capital for the completion of repair shops at Everett. The shops now in use are the inheritance of horse car days, wholly unfit to meet every day needs in painting, repairing and caring for rolling stock. The annual saving that would follow the use of the shops which have been planned would be very large.

Utility Commissioners Concerned Over Depreciation Case

Opposition to transfer of jurisdiction over rates of depreciation of the Washington Railway & Electric Company from the District of Columbia Public Utilities Commission to the Interstate Commerce Commission is made by the National Association of Railway & Utility Commissioners.

The association, according to its general solicitor, John E. Benton, desires to make the issue a test case. It claims that if jurisdiction over rates of depreciation of the local electric railway is transferred from the District Utilities Commission to the Interstate Commerce Commission, it might lead to the taking from all state utilities commissions the power to fix rates of depreciation for street railways and transfer it to the Interstate Commerce Commission.

Seattle Withholding From Peter to Pay Paul

Accumulation of the $1,240,000 fund to meet the various items of indebtedness of the Seattle (Wash.) Municipal Street Railway falling due between now and March 1, has been completed, with a surplus of approximately $4,000.

To accumulate the fund, the railway has been on a warrant basis since Dec. 24, and warrants of the railway are now outstanding in the sum of $599,581 bearing interest at 6 per cent, and honored by local banks. City Treasurer Collier stated that the city would probably redeem the warrants on Feb. 1.

Lower Fares, but Not Increased Patronage

Cincinnati electric cars carried 320,000 fewer passengers in December, 1921, than in the month of December 1920, despite the fact that the rate of fare was a full cent less per ride. This is shown in the financial statement of the Cincinnati (Ohio) Traction Company received by William Jerome Kuertz, Street Railway Commissioner.

The actual number of revenue passengers at a 7½-cent fare in December was 9,216,583 in the preceding December 9,535,949 revenue passengers were carried at an 8½-cent fare. In actual earnings the railway received $100,180 less in December, 1921, than in the preceding December. Yet the month showed a surplus of $23,153—just offsetting the November deficit—while in December, 1920, there was a deficit of $64,157.

The deficit was due to both higher operating expenses and the fact that the company was then paying the city franchise tax. Earnings for December, 1921, totalled $723,004 and expenditures $699,851. The figures for December, 1920, were: Earnings, $823,184; expenditures, $887,340.

$620,046 Surplus in Baltimore

According to figures made public on Jan. 26 by President C. D. Emmons of the United Railways & Electric Company, Baltimore, Md., there were 15,843,199 fewer passengers carried last year than in the year before, and 5,799,986 fewer than were carried in 1919. The total number carried last year was 238,090,980, which represents a loss of 6.24 per cent as compared with the previous year, but that year the increase in this traffic was 4.12 per cent over 1919.

While fewer passengers were carried, the car miles on the company's lines last year totaled 35,708,000, as against 35,522,000 in 1919. With this loss in traffic the company was able to come through the year with a surplus after all expenses and fixed charges of $620,046, as compared with $1,045,650 in 1920.

This surplus was about $280,000 less than has been estimated as necessary by the Public Service Commission and about $780,000 less than the commission has estimated should be earned to keep the company's property and service at the best standard, but even this $620,046 was made possible only by the strictest economies even with a 7-cent fare.

Many of the economies were not forced upon the management until about the middle of the year, when it became apparent that the expected improvement in conditions was not to materialize soon.

Total revenues from all sources last year were $16,325,066, a decrease of $988,532; operating expenses were $9,940,861, a decrease of $465,722; depreciation was put at $816,253, a decrease of $49,246, leaving net operating revenue of $5,567,951, a decrease of $473,383. Taxes amounted to $1,736,700, a decrease of $28,713, and fixed charges to $3,310,437, an increase of $17,111. Non-operating income of $99,233 added to the gross income left the net surplus as stated.

December traffic was greater than that of any previous month since July, which is unusual and indicates that further improvement may be expected after the present slack season is over.

$529,237 Balance in Washington in 1921

The financial condition of the Washington Railway & Electric Company, Washington, D. C., and its subsidiaries showed substantial improvement during 1921. According to the report of William F. Ham, president, submitted to the annual meeting of stockholders on Jan. 21 the earnings, subject to revision on final audit, were:

Gross earnings from operations, $5,455,623; miscellaneous income, including dividends from the Potomac Electric Power Company, $654,511. Gross income, $6,110,135. Operating expense, including depreciation, taxes and miscellaneous charges, $4,382,937; interest on funded and unfunded debt, $772,960; payment of 5 per cent dividend on preferred stock, $425,000. Total, $5,580,897. Deducting this from gross income leaves balance for the year 1921 credited to profit and loss of $529,237.

In discussing this Mr. Ham said:

> From the foregoing statement it will be seen that the company has made material progress as compared with recent years. With the exception of dividends from the Potomac Electric Power Company, no income was received by the Washington Railway & Electric Company on its investments in stock of subsidiary companies. It is, however, gratifying that the subsidiary railway companies show an operating profit to the parent company (without any allowance for return upon investment) of $30,005, as compared with an operating loss of $199,798 in 1919.

There was a noticable increase in the efficiency of employees in each and every department. This is well illustrated by the reduced turnover in labor, as evidenced by the number of new trainmen employed. During 1921 only 285 new trainmen were put into the service, compared with 667 in 1920, and 1,270 in 1919.

The expenditures and allowances for maintenance and depreciation of track and roadway again reached large proportions, the total for the year being $1,081,615.

During the first eight months of the year the rate of fare within the District of Columbia was 8 cents cash or tickets at the rate of four for 30 cents, during which period the average fare was 7.53 cents per pay passenger. By order of the Public Utilities Commission of the District of Columbia, effective Sept. 1, 1921, the rate of fare was reduced to 8 cents cash or tickets at the rate of five for 35 cents, such rate to continue in force until March 1, 1922. This reduced the average fare during the last four months of the year to 7.06 cents per pay passenger.

Financial News Notes

Right Sought to Issue $2,272,000 Bonds.—The Illinois Traction System, Peoria, Ill., has asked the Illinois Commerce Commission for permission to issue $2,272,000 first refunding bonds, to bear 5 per cent interest and maturing on Dec. 1, 1939.

No Bidders for Bonds.—No bids were received by City Comptroller Harry W. Carroll on the proposed $680,000 issue of street railway utility bonds, with the proceeds of which the City Council of Seattle planned to finance the retracking of First Avenue. The fact that there are already several bond issues, including the $15,000,000 railway bonds which would be superior liens against the system, was given by officials as an explanation for the absense of bidders. The bonds were publicly advertised.

Expenditures Approved for Terminal Entrance.— Judge John M. Killits in Federal Court at Toledo, Ohio, has granted to B. J. Jones, receiver for the Ohio Electric Railway, an order permittng him to buy a share of stock in the Toledo Interurban Station Company for $100, make a deposit of $500 with that company and expend about $4,000 to make necessary track connections to enter the downtown district over the tracks of the Community Traction Company. Mr. Jones was also authorized to pay a power bill of $3,121 made with the Toledo Edison Company for electric current delivered to Lima and points along the Ohio Electric Railway between Toledo and Lima.

Dividends Ahead for Eastern Massachusetts Issues. — The Boston *News Bureau* says that the capital readjustment plan of the Eastern Massachusetts Street Railway trustees having been declared operative, it is expected inauguration of dividends on first preferred stock will follow in due course. Present authorized amount of first preferred is $1,027,700 and assuming that the entire $3,239,000 sinking fund stock is exchanged for first preferred under the plan, the maximum possible amount outstanding will be $4,266,700. To pay dividends on this issue will require surplus earnings of a little more than $250,000 per annum. For the 1921 calendar year the Eastern Massachusetts earned more than the full cost of service as permitted under the special act, viz., $2,400,000. Bond interest and rentals of leased lines amount to $1,600,000 a year, indicating a leeway of $800,000. In fact, the road is earning so much more than would be necessary for paying full dividends on first preferred as to suggest that preferred B stock also is steadily wheeling into line for dividend consideration.

Traffic and Transportation

Preliminary Report Submitted

Engineer Vanneman Sees Flaws in System—City Partially to Blame for Interference With Service

Charles R. Vanneman, chief engineer of the New York Public Service Commission, has submitted a preliminary report on the service provided by the United Traction Company, Albany, N. Y. An investigation had been requested of the commission by P. L. Merriman, a lawyer of Albany, who charged the traction company with giving inadequate service.

Mr. Vanneman said that his observations of travel on Jan. 5 and 6 led him to make certain suggestions to the United officials on improvement of service. Checks made on these observations on Jan. 18 and 19 showed that the improvements had been effected, but that twenty-one additional trips should be provided during the evening rush hours. To relieve this rush-hour condition extra conductors board the cars carrying standing loads on Pine Hills, Delaware Avenue and West Albany line to expedite the loading and unloading. Employees have been stationed at various places to sell tokens and to assist in the rear door alighting. At the suggestion of the investigators additional employees were stationed at State and Pearl Streets to speed up the loading and the unloading.

To what extent the operation of the one-man car is instrumental in causing poor service was explained in detail by Mr. Vanneman in this report. After studying this operation of the past two months Mr. Vanneman gives seven factors involved in the one-man congestion which is apparent since the termination of the strike. They are as follows:

1. Unfamiliarity of a large number of new employees with the new cars, as well as the routes.
2. Unfamiliarity of old men taken back with one-man operation.
3. Unfamiliarity of the public with one-man operation, and an apparent unwillingness to move to the rear of the car.
4. Inadequate supervision by the officials, especially during the rush hours.
5. Interference of vehicular traffic, especially on North Pearl Street.
6. Since the snow has come, interference of vehicles, both wilful and unavoidable.
7. Increased time required in loading and unloading by one-man cars.

In making suggestions for the lessening of the congestion Mr. Vanneman suggests that the company acquaint its employees thoroughly with the one-man car apparatus and now and then examine all operators to see that they are thoroughly familiar with the various devices used. He further believes that an extensive publicity campaign should be waged by the traction company informing the public of the need for "passing to the rear of the car."

As to the fourth cause, namely, inadequate supervision, Mr. Vanneman emphasizes the need for prompt dispatching which should begin with the supervising force and be passed on to the operators whose co-operation is absolutely necessary.

The report stresses as a great interference with service by the United Traction the unlimited parking rules on North Pearl Street between State Street and Clinton Avenue, the operation of an increasing number of W. I. A. T., Delmar and Stingerlands buses and the interference by vehicles where snow removal has not been undertaken by the city. The city should abolish these interferences.

As a possible relief for the increased time required for loading and unloading one-man cars, Mr. Vanneman believes that the rear-entrance front-exit type with the pay-as-you-enter system is the best for one-man car operation, though he feels such a plan is impossible just now in Albany.

Following a conference between Mayor Hackett and H. B. Wetherwax, vice-president of the United Traction Company, announcement was made that new schedules would be put into effect to improve service. It is unofficially reported that the city will urge the railway to put into service many of the old and experienced men employed by the company previous to the strike of January, 1921, so that the cars will be operated by trained employees.

Passenger Traffic Increasing

Sixty-three million passengers were carried last year on the interurban, suburban and Akron, Canton and Massillon city lines of the Northern Ohio Traction & Light Company. Despite the fact that 1921 business showed a sharp decline from that of 1920, traffic is now steadily increasing on all lines, as indicative of a general improvement in business conditions throughout the territory.

The company's figures show 33,000,000 passengers carried on the Akron city lines, as compared with 49,000,000 in 1920; about 16,000,000 on the interurban and suburban systems, as compared with 20,000,000 the year before last; 11,000,000 in Canton, or 4,000,000 fewer than 1920, and 1,600,000 in Massillon, as compared with 2,000,000 the preceding year. The heavy passenger records of 1920 are attributed largely to the fact that the first six months of 1920 covered an area of peak prosperity for all the cities, including Akron.

Although the gross revenue for 1921 will be lower than that of 1920, the net revenue is expected to show a slight increase, attributed to decreased operating costs.

Plan Through Interurban Service

Indianapolis Lines Anticipate Extension of Runs to Points in Four Mid-West States

Extension of through interurban service centering in Indianapolis, Ind., whereby that city may have direct connection with points over four central west states, including Ohio, Indiana, Michigan and Kentucky, is being planned by executive officers of many of the interurban systems in the Central Electric Railway Association. Further extensions may be made to include eastern coast territory.

The Terre Haute, Indianapolis & Eastern Traction Company was one of the first railways of the central Indiana division to establish through service. Four trains are run daily by it each way between Indianapolis and Dayton, on a four-hour schedule. This service was started in the latter part of December, and substitutes, in a measure, for through service that formerly prevailed between Indianapolis and Zanesville, Ohio, discontinued because of hindrances that arose as the result of the unscrambling of the Ohio Electric Railway under the receivers.

The Union Traction Company, which has its main offices at Anderson, has contemplated the establishment of through service between Indianapolis and Toledo and Cleveland, via Fort Wayne and Lima, but it is said that the plan has been given up. Connections with the two northern terminals are available through a through rate in effect, but a change of cars is necessary at Lima and Fremont.

Indianapolis will have direct interurban connection with downtown Cincinnati if plans of the Indianapolis & Cincinnati Traction Company to extend its main line from Rushville to the Ohio metropolis are carried out. The proposed extension will be by way of Metamora, Brookville and Harrison, which is on the state line, striking Cincinnati corporation line at Westwood, thence into the city, 5½ miles over the track of the Cincinnati-Westwood line, then on Queen City Avenue to the two-tube subway being built from Canal and Walnut Streets up the old Miami canal bed to Brighton.

C. L. Henry, president of the railway, said the company had held options on the Cincinnati & Westwood property for about six years and that the purchase and building of the 3,000-ft. stretch would follow the completion of an engineering survey. Decision as to the time of beginning construction work, he said, would depend on bond market conditions.

The extension of the Rushville line will give the company 111½ miles of main line trackage. The line from Rushville, southeast, will be through virgin territory and, according to Mr. Henry, will add greatly both to the freight and passenger business.

Auto Immeasurably Inferior

Jitney Service Is Maintained at Least in Part at the Expense of Trolley Riders

The Public Service Railway, Newark, N. J., has issued a statement replying to an article in the Newark *News* on a comparative census taken by the Public Utilities Board of electric railway and jitney traffic. The statement follows in part:

In its issue of Dec. 28, the *News* printed an interesting article based on a partial census of jitney and street car traffic made by the Board of Public Utility Commissioners.

The word "partial" is used advisedly because the statistics admittedly did not cover non-competitive routes, and of the eleven routes referred to no cognizance was taken of traffic handled by the street cars on such portions of said routes that the jitneys did not attempt to serve.

Unless this fact be understood and kept in mind, the figures given will present a distorted picture of the comparative service rendered by the two systems. The truth is that in the metropolitan district of Newark—practically coincident with Essex County and West Hudson—the electric railway carries over three times the number of persons transported by jitneys. Moreover, the trolley routes constitute a unified and co-ordinated system, providing communication between various parts of the district and by means of transfers make this communication possible at a cost (for all but short hauls) below that charged for a like amount of service supplied by jitneys. On the other hand, the operation of the jitneys is not so co-ordinated, and in consequence the number of passengers carried by jitneys and by cars over any particular route is not a true measure of the comparative use of the two facilities.

Is it not apparent that the standard of bus service does not approach the standard of electric railway service, and that no fair comparison of the rates charged by the two systems is possible without an allowance for the marked difference in the quality of service?

As was stated before, the test of any local transportation system is its ability to handle the peak load, which under conditions prevailing in this district is the evening rush load, the traffic between 4:30 and 6:30 p.m. Unless the system is capable of taking care of this maximum demand it fails to meet public requirements. On the other hand, if it satisfactorily meets this test it is necessarily in a position to take care of the traffic at all other periods of the day.

The Utility Board's figures prove that the jitney bus cannot take the place of the street car. The figures also prove that by slightly increasing the number of trips the street cars alone could handle all the rush hour traffic now handled by both street cars and jitney with more comfort to the passenger than the jitneys now afford that portion of the traffic carried by them.

Since this is true in the rush hours it follows that the traffic for the other hours of the day could be efficiently handled by street cars alone. Incidentally it might be interesting to recall that prior to May, 1916, there were from 480 to 500 car movements over the intersection of Broad and Market Streets every day during the "peak" hour, whereas the present scheduled number of movements is 365 during the busiest sixty minutes of the day. Rerouting, owing to the opening of the Terminal, accounts for the changed conditions.

As it is, jitney service is being maintained, at least in part, at the expense of those who patronize the street cars. Even if it were likely that the communities would long permit an exclusive local transportation system, the low service standard which makes it possible for the jitneys to exist, it is evident that it is only because the street cars bear the bulk of the transportation burden and assume the most costly part of the performance that the jitneys can function under existing conditions, and that were they to attempt to perform all the service they would fail in Newark as they have failed wherever the trial has been made.

In a recent editorial the *News* suggested that the local transportation tangle might come to such a pass that the part of wisdom would be to remove from electric railway operation all public restrictions, except on financial transactions, and let the trolley and jitney battle to a finish for the right to survive. In commenting on this suggestion the railway says that without attempting to forecast the result of such a contest it may be properly pointed out that were the jitney to win the consequent service to be secured by the public would be jitney service, according to jitney standards, in no way comparable with the service given by the street cars and in all respects immeasurably inferior.

Skip-Stop Returns to Indianapolis

Indianapolis is going back to the skip-stop and middle-of-the-block loading and unloading in the downtown district, according to a verbal order issued recently by the Board of Public Works to Dr. Henry Jameson, chairman of the board of directors, and Robert I. Todd, president of the Indianapolis Street Railway. Seventeen platforms to aid passengers to board the cars and alight from them will be placed soon in the downtown districts to facilitate traffic conditions. This action by the Board of Public Works carried out a suggestion made last week to the board by a committee representing the Indianapolis Chapter of the American Association of Engineers.

Five-Cent Fare Extended Three Months

The City Council of Akron, Ohio, at a meeting on Jan. 24 decided to extend the temporary 5-cent fare agreement with the Northern Ohio Traction & Light Company. The agreement expired on Feb. 1 and will now be continued until May 1. If the emergency franchise had not been extended the fare would have reverted to the old rate of six tickets for 25 cents.

According to a statement issued recently by the traction company the city cars carried only 34,322,022 passengers in 1921 against 54,937,862 in 1920. With gross earnings for the year amounting to $1,769,349 and operating expenses including taxes but not including interest charges or depreciation amounting to $1,835,619 the company claims a deficit for year of $66,070.

$2,884 Loss on Bridgeport Division

A report submitted to the Public Utilities Commission at Hartford, Conn., by President L. S. Storrs of the Connecticut Company, Hartford, Conn., concerning the operating results of the Bridgeport division, for the week ended Jan. 21 as compared with like days of the last week of the flat 10-cent fare, shows a loss of $2,884. A similar report to the commission and a comparison for the Norwalk division, which is also undergoing the 5-cent fare experiment, shows a gain of $161.17. The trial test of the 5-cent fare in both cities is for a period of ninety days, and will terminate in a few weeks.

Brooklyn Enters Whalen Bus Plan

Brooklyn, N. Y., is included in plans for a city bus system which Grover A. Whalen, commissioner of plant and structures for New York City, has submitted to the Board of Estimate. Commissioner Whalen's plan includes the substitution of bus routes numbering between 97 and 159 for the trolley lines. The change involves a $25,000,000 expenditure.

In advocating the plan the commissioner said:

> It must be recognized that the trolley system of transportation in this city has broken down. It cannot be rehabilitated financially. The plan of an adjustable fare, the "barometer" scheme, would merely be giving oxygen to a comatose system, stimulating the market in traction issues, enabling insiders to unload, doubling fares and postponing for years any real solution of the city's traction problem.

The first step in abolishing trolley service in the borough of Manhattan would be to eliminate fifteen car routes as follows:

> Broadway-Seventh Avenue, Ninth Avenue, Eighth Avenue, Sixth Avenue, Madison and Fourth Avenues, Second Avenue, Avenue B, Eighty-sixth Street (crosstown), Forty-second Street (crosstown), Thirty-fourth Street (crosstown), Twenty-third Street (crosstown), Fourteenth Street (crosstown), Eighth Street (crosstown), and Grand Street (crosstown).

The proposal of Mr. Whalen will be dealt with at greater length in the issue of Bus Transportation for February.

Plans of Mayor John F. Hylan and other city officials of New York, N. Y., for supplanting surface trolley lines of the city with buses were whipped into more concrete form at a recent public hearing of the Board of Estimate when Comptroller Craig moved that the Corporation Counsel make a formal statement as to just what steps could be taken to tear up the tracks of trolley lines that have already abandoned service. The hearing was made public in order that interested parties might discuss the bus plan projected by Mayor Hylan, which involves the tearing up of all surface tracks, and the issue of $25,000,000 corporate stock for construction, equipment and housing of 3,500 motor buses.

Fare Case Taken to State Supreme Court

The suit instituted in the Civil District Court against the Commission Council of New Orleans, La., by Attorney-General Coco, which was dismissed for want of action, has been taken to the State Supreme Court by the Attorney-General. The official just mentioned sought to deny the authority of the Commission Council to enter into an agreement with the New Orleans Railway & Light Company on a rate of railway fares below that named in its franchise. The matter will probably receive early consideration by the Supreme Court, which has, at the request of the Attorney-General, granted an advance hearing of the suit by placing it on the preferred docket of the court. Feb. 27 has been fixed as the date for the hearing. The city of New Orleans has not yet filed its answer.

Oles After the Jitneys

According to the Youngstown *Times* of Jan. 15 Mayor George L. Oles snatched time that day between granting interviews to out-of-town newspapermen and posing for movie photographers to reverse himself on a plank of his now famous platform—that calling for "throwing out the street cars and turning the streets over to the jitneys." Mr. Oles said:

> Life is too short to spend arguing with jitney drivers and the quack lawyers who come in to intercede for them.
>
> I am convinced that if the jitneys were abolished the street car fare would be 5 or 6 cents instead of 9 cents. I have already cut the number of jitneys 50 per cent by refusing licenses to men with any police record.

Oles has issued orders for enforcement of jitney regulations including one requiring a $10,000 bond, and another requiring that the interiors of all jitneys be lighted. He urged Council not to repeal the rule requiring owners and drivers to be American citizens.

Interurban Rates Advanced by Detroit United

The interurban rate of fare of the Detroit United Lines has been made 2 cents a mile instead of 1½ cents. New tariffs under the law have been filed with the Michigan Public Utilities Commission. The new rate is in accord with and under the authority of the Glaspie act governing interurban fares.

The Glaspie act authorizes the commission to appraise interurban railway properties and fix rates of fare in accord with operating expenses, maintenance of the property and a fair return upon the investment. This appraisal is now under way and when completed the commission will be able to act officially as to the necessary rates.

The Glaspie act has, however, an interim provision fixing certain temporary rates in accord with the gross receipts of the lines but absolutely without regard to the expense of operation. Under this temporary provision when the gross receipts per mile of main line track exceed $14,000 a year the fare rate is to be 1½ cents. The Detroit United earnings in 1920 were such as to compel this cent and a half rate. In 1921, however, there was a marked recession in business with the result that the gross interurban earnings fell to slightly more than $12,000, and this gross earning automatically placed the temporary rate of the company at 2 cents a mile.

While it would be permissable for the company to collect an interurban rate to and from the interurban depot in Detroit, the company will continue to apply the present rate of fare within the so-called one-fare zone.

The interurban mileage rate will continue to be from Six-Mile road on Woodward Avenue for the Pontiac and Flint Divisions; from Leesville on Gratiot Avenue for the Leesville Railway; from the Country club on Jefferson Avenue for the Shore line; from Addison on Michigan Avenue for the D., J. & C. railway, from the Junction on West Fort Street for the D., M. & T. Short Line railway, and from Turner Y on Grand River Avenue for the Orchard Lake division.

Outbound interurban riders on Woodward, West Fort and West Jefferson continue to pay the combined city and interurban fare under the agreement of joint city operation on these routes. Interurban fares for children under 12 years of age continue at half rates with a minimum collection of 5 cents.

Will Establish Resort Within Easy Reach of Trolleys

The establishment of bathing places along the lines of the system is a project that is being worked out by the officials of the Monongahela Power & Railway Company, Fairmont, W. Va., to meet young people's demands which have been growing in West Virginia communities for years. If the proper sites can be secured the company will likely establish one or two of these resorts within easy distance of each of the important cities of its lines.

It will not be the intention of the company to operate the beaches, but to secure the locations and turn them over to capable people for the operation. Officials have been looking over the ground with the intention of finding a suitable bathing place in the vicinity of Fairmont.

Sault Ste. Marie Fare Increased to Seven Cents

Seven cents is now the fare on the lines of the Sault Ste. Marie (Mich.) Traction Company. The increase was granted on order of the Public Service Commission, which stated:

> It appears in the testimony that a great many more people travel on tickets purchased at twenty for a dollar than on the straight cash fare. It also appears that the average fare for travel is .059, and that the average fare necessary to meet the operating expenses is 07. We find further that even though this commission does grant the new rate the company will still fail to receive sufficient revenue to meet the operating expenses alone, unless more passengers are carried.

Transportation News Notes

Ticket Fare Reduced.—Officials of the Adrian (Mich.) Street Railway announced recently, following the annual meeting, that the 10-cent fare would remain. Tickets, however, will be sold at the rate of six for 40 cents instead of 50 cents.

Through Freight Rates Established.—The Jamestown, Westfield & Northwestern Railroad, operating between Jamestown and Westfield and connecting with the Pennsylvania Railroad at Mayville and the New York Central and Nickel Plate railroads at Westfield, has inaugurated through freight rates over its line in connection with the Pennsylvania lines at Mayville.

Will Consider Fares.—The Public Service Commission has announced that it will hold a public hearing in Hoquiam, Wash., in the near future to consider electric railway fares of the Grays Harbor Railway, Light & Power Company. The present fare is 10 cents or three for a quarter, for both local and inter-city rates, Hoquiam to Aberdeen. It was fixed by the commission sometime ago, but has caused considerable protest from residents of both cities.

Jitney Business Unpopular in Wisconsin.—The jitney business has not proved permanently popular in Wisconsin. The Railroad Commission records show that during the past year sixty-three bonded carriers filed cancellations of their bonds, and that approximately one-third of the carriers who started in the business during 1921 did not stay with it for the year. High operating costs and lower competing street car fares are given as the reason for its unprofitableness.

P. A. Y. E. Cars Will Be Installed.—Plans for rerouting the traction lines of Jamestown, N. Y., and the placing in operation of P. A. Y. E. cars are now being made by A. N. Broadhead, president of the Jamestown Street Railway. Under the present arrangements cars operating over various lines meet in the center of the city at a central waiting room and then return over their various routes. Present plans provide for consolidating the routes so that through service will be maintained and then the waiting room can be abolished.

Protest Establishment of Motor Truck Line.—The Valley Railways, Lemoyne, Pa., and the Conestoga Traction Company, Lancaster, Pa., together with the Pennsylvania, Reading & Susquehanna River and Western Railroads, are protesting the issuance of a certificate of convenience to the Pyramid Haulage Company to conduct a motor freight service between Harrisburg, York, Lancaster, Gettysburg and points in Juniata, Cumberland and Lykins valleys. They are contending that the service is not needed.

Interurban Wins Steam Road Passengers.—The Lake Erie & Western Railroad, a steam line, with headquarters in Indianapolis, Ind., has discontinued its through train from Fort Wayne to Indianapolis and is now transferring passengers at Muncie as formerly. This condition of affairs has increased the patronage on the through interurban trains operated between Fort Wayne and Indianapolis by the Indiana Service Corporation. For the purpose of still further increasing the patronage on these trains the Indiana Service Corporation has recently been advertising extensively for the Hoosierland and the Wabash Valley Flyer, the corporation's two principal trains running between Fort Wayne and the state capital.

Personal Mention

Two Ohio Companies Make Changes

G. D. Nicoll Appointed Engineer Indiana, Columbus & Eastern—F. J. Foote Is Superintendent

Appointments for the new year have been made on the Indiana, Columbus & Eastern Traction Company and the Columbus, Newark & Zanesville Electric Railway, Springfield, Ohio. G. D. Nicoll becomes chief engineer of both companies with direction of structures and power plants, substations and overhead lines and the distribution and sale of electrical energy. F. J. Foote becomes superintendent of motive power and equipment in charge of mechanical operation of power plants and substations and in charge of the rolling equipment, car shops and houses. For twelve years he has been connected with the Ohio Electric Railway, Cincinnati, which leases both of the above companies. He was at first the Ohio Electric Company's master mechanic, and in June of last year was appointed superintendent of power. For some time past he has been supervising the power houses and substations of the Columbus, Newark & Zanesville and Indiana, Columbus & Eastern Traction companies.

W. L. Clayton, who has acted as chief dispatcher of the Ohio Electric and assistant superintendent of the Columbus-Dayton division since 1917, will now hold the post of superintendent of the Indiana, Columbus & Eastern Traction Company, in charge of transportation of the Dayton-Union City, Dayton-Columbus and Columbus-Orient divisions.

Another appointment of interest is that of A. C. Starkey as superintendent in charge of transportation of the Springfield-Lima and Lima-Defiance divisions. On the Columbus, Newark & Zanesville Electric Railway, F. G. Clunis has been advanced to the position of superintendent of the Columbus-Zanesville and Newark-Granville divisions, and B. S. Watters of the Zanesville City Railway. G. B. Darnell will have charge of the maintenance of way and structures of all divisions of this company as roadway engineer. A. E. Peckham, as roadway engineer for the Indiana, Columbus & Eastern Traction Company, will have charge of Springfield-Lima and Lima-Defiance divisions.

A. V. Bland has been made assistant to J. H. McClure, receiver of the Indiana, Columbus & Eastern company.

Changes Made in Supervisory Forces

The Public Service Railway, Newark, N. J., announces the following changes in supervising forces. Aaron H. Hill, supervisor at Roseville, becomes assistant division superintendent. Frank Lindner, depot master at Roseville, has been made supervisor at Roseville. William Eckert, station master at Hilton carhouse, has been made supervisor of the Bergen Street carhouse, and Arthur Symington, supervisor of the West New York carhouse.

Mr. Arkwright Carries On

President of Georgia Railway & Power Company Puts in Force Decided Innovations

Preston W. Arkwright, the energetic president of the Georgia Railway & Power Company, Atlanta, Ga., is hitting the bull's-eye with phenomenal success in dealing with the public and with employees. His are no pot-shots. They are carefully aimed, coolly executed and sure of the mark. In other words, to leave the field of the marksman, Mr. Arkwright is that person known as a successful leader of an electric railway.

"MR. ARKWRIGHT AND HIS BABY DAUGHTER"

Lenny, Photographer

"MR. ARKWRIGHT AND HIS DAUGHTER'S BABY"

If one thing more than another can be said to account for Mr. Arkwright's excellent administration since he became president in 1912, it is ideas faithfully carried to completion. It is mere reiteration to recall Mr. Arkwright's former rôle as Moses in leading the Georgia Railway & Electric Company from that troublesome land of public dislike and financial distress into the promised land of public trust and pecuniary success. Through straightforward dealings, Mr. Arkwright made the company famed for the civility and kindness of its employees, and for its liberal and fair treatment of the public.

So much for history, but Mr. Arkwright continues to give historians a chance to scribble a few notes. He has, for example, not let well enough alone in the company's relation to a public which he will not damn, but constantly is striving to make traveling safer, quicker, more enjoyable. Ergo, this latest innovation in Atlanta: Thirty supervisors of the company have been given complete police authority. They are clothed in the regulation supervisor uniform of the company, but in addition they wear the regulation police badge on cap and coat. The men who are assigned to the down-town district also wear a medallion on the left arm, signifying that they are members of the traffic squad. These men are all provided with rainy-day uniforms—white rubber coat, cap and boots—which mark them plainly on gray days. In white or in blue, it is Mr. Arkwright's idea that the Georgia Railway & Power Company's men shall be constantly on the job to serve.

One thing Mr. Arkwright has never forgotten, namely, that his company is made up of human beings and that his company is constantly serving human beings. An observer of Mr. Arkwright's activities recently remarked, "There is a man who is filled with the milk of human kindness." A recent manifestation of this kindness and fairness is the wage agreement between the company and the employees in which no attempt was made to reduce the wages below what were paid in 1921. Instead a new method was used whereby a new wage scale was instituted for men employed after Jan. 1 as motormen or conductors, and in shops and carhouses.

Mr. Arkwright's life has been spent almost exclusively in the South. He was graduated from the University of Georgia in 1891, studying law during his last year there. He began the practice of law in Atlanta and ten years later championed the cause of the unification of the electric railway and lighting systems of the city into the Georgia Railway & Electric Company. From 1902 until 1912 as president he guided the development of the utility company, but in the latter year resigned to become president of the Georgia Railway & Power Company, which leased the former property.

Mr. Greenland Honored Again

Popular Operator in Charge of Fort Wayne Lines Is Selected to Head Central Association

Samuel W. Greenland, newly elected president of the Central Electric Railway Association, is vice-president and general manager of the Indiana Service Corporation, Fort Wayne, Ind. This company owns and operates the electric railways in Fort Wayne, Wabash, Peru and Logansport, and the interurban lines connecting Fort Wayne with these cities and with Lafayette and Bluffton, Ind., and does a general power and lighting business.

Mr. Greenland's selection to head this important railway association comes after long interest and activity in the work of the association and bespeaks the well-placed confidence and esteem with which he is held by the members generally. Calm, energetic and aggressive in striving for the betterment of his company and its service, and with a broad, sound view of the utility field, he is respected by his contemporaries and associates, and has that wholehearted respect and loyalty and good will of his employees which makes for best company and public relations.

Mr. Greenland was born at Clarion, Pa., on April 27, 1879, and was educated at the Pennsylvania Military College, Chester, Pa., and at Penn State University, where his work in electrical engineering was concluded in 1900. His first job in the utility field was with the Bell Telephone Company at Pittsburgh in connection with construction work. In 1904 he became connected with Robert W. Watson, consulting engineer, Harrisburg, Pa., where for three years he was engaged principally in making engineering reports for financial interests. In 1907 he became general manager of the Columbus Railway, Light & Power Company, which furnishes the gas, electric light and railway services in Columbus, Miss. At the time the Wabash Valley Traction Company was reorganized to become the Fort Wayne & Northern Indiana Traction Company, in 1911, he went to Fort Wayne as assistant general manager and later in the same year was made general manager. Upon the reorganization of this company into the Indiana Service Corporation in 1920, he was elected vice-president as well as general manager.

In addition to his connection with the Indiana Service Corporation, he is general manager for the receiver of the Fort Wayne, Van Wert & Lima Traction Company, general manager of the Fort Wayne & Decatur Traction Company, and president of the Service Coal Company, Fort Wayne.

Mr. Greenland has been an officer of the Central Association for the past three years and a member of the executive committee for some five years. He is a member of the American Institute of Electrical Engineers and the American Society of Mechanical Engineers. He has been active in local affairs and is a past president of the Rotary Club of Fort Wayne. He is also active in the work of the American Electric Railway Association, and is now a member of the committees of that association on the trackless trolley and one-man car. In 1917 he served as president of the Indiana Electric Light Association. During the war he was a major in the chemical warfare section of the army and had charge of the erection of a 20,000-kw. steam generating station at the Edgewood (Md.) Arsenal. He also looked after the operation of the utilities at Edgewood.

Mr. Collier at Poughkeepsie

W. Rawson Collier has resigned as general sales manager for the Georgia Railway & Power Company, Atlanta. He has been connected with the company at Atlanta for ten years in the capacity mentioned and is nationally known in public utility circles as an engineer acquainted with all features of gas and electric service. He will take an important executive position with the Central Hudson Gas & Electric Company, Poughkeepsie, N. Y. He will be succeeded at Atlanta as sales manager by his brother, C. A. Collier, who has been assistant sales manager since 1914.

Mr. Collier has been associated with the Georgia Railway & Power Company since 1905, when he entered the company's engineering department. Three years later he became contract agent and in 1912 was promoted to the position of sales manager. During 1919 and 1920 Mr. Collier was both sales and operating manager.

His technical education Mr. Collier received at the Massachusetts Institute of Technology, where he was graduated in 1900. He entered the firm of Collier & Brown after finishing college, designing and constructing many electric lighting plants in the Southern states.

Phillips General Manager in Muskogee

John G. Phillips, for many years manager of electric railway properties, has been appointed general manager of the Muskogee (Okla.) Electric Traction Company, and the Shawnee-Tecumseh Traction Company, Shawnee, Okla. He succeeds A. B. Coryell, who has been serving temporarily since the resignation of W. M. Cutlip in November of last year.

From 1920 to 1921 Mr. Phillips was general superintendent of the Mobile Light & Railroad Company, Mobile, Ala. Before taking that position he was with Ford, Bacon & Davis, engineers, doing valuation work for them. Mr. Phillips was previously purchasing agent and superintendent of rolling stock of the Hudson Valley Railway, Glens Falls, N. Y., and for some time was assistant general manager of the company operating there.

N. B. Rhodes Park Purchaser of New Orleans

Norman B. Rhodes, New Orleans, who has had a long and varied experience with public utilities north and south, has been appointed superintendent of purchases for the Board of Park Commissioners of New Orleans. After graduating from the Cheltenham Military College, Mr. Rhodes entered the service of the Richmond Railway & Power Company, Richmond, Va., and later that of Stone & Webster, at Savannah, Ga. He was superintendent of the Beaumont (Tex.) Traction Company and of the Southern Railway & Light Company, Natchez, Miss. He left his position as superintendent of the electric and railway departments of the Jackson Light & Traction Company, Jackson, Miss., to enter the navy at the beginning of the war. He was on duty at the Algiers Naval Station and afterward supply officer of the U. S. S. Edgar F. Luckenbach until the close of the war.

R. F. Busher, who has for some time been chief of the Bureau of Accounts and Statistics of the Public Service Commission of Pennsylvania, has resigned from that position. On Feb. 1 he will enter the practice of public accounting.

Samuel Riddle, vice-president of the Louisville (Ky.) Railway, was elected a director of the Louisville Board of Trade at the annual meeting on Jan. 10. This is the first time that a representative of the railway has even been on the directorate of the Board of Trade.

Roy L. Duncan, for the past ten years in the employ of the Connecticut Company, Hartford, Conn., and its predecessors as foreman of the welding, grinding and bonding department at the Hartford division, has left the employ of the company. He is to take a position as service man in the New England territory for the Rail Welding & Bonding Company of Cleveland, Ohio. Mr. Duncan has been presented with a traveling bag and equipment by members of the track department. He assumed his new duties on Feb. 1, and his work will take him to all points in New England.

Fred Durant, Troy, N. Y., was recently appointed traffic superintendent of the Trenton & Mercer County Traction Corporation, Trenton, N. J. He is an electric railway executive with wide operating experience. He secured a position as conductor in 1893 with the Troy & Lansingburg Traction Company and after working at that position for a time became a motorman. Later he was promoted to inspector, and in 1917 was advanced to the position of division superintendent with quarters at the North Troy carhouse. In 1900 the Troy & Lansingburg and the Troy City Traction companies were merged under the name of the United Traction Company and Mr. Durant remained with the new company in the same position.

Manufactures and the Markets

DISCUSSIONS OF MARKET AND TRADE CONDITIONS FOR THE MANUFACTURER, SALESMAN AND PURCHASING AGENT

ROLLING STOCK PURCHASES BUSINESS ANNOUNCEMENTS

Steel Pole Sales Increase

There are many inquiries for steel poles and investigation discloses that these queries are the forerunners of much proposed spring construction. There are quite a number of combination railway and lighting pole jobs awaiting favorable action but electric railway companies are buying only such poles as are necessary, on account of their generally poor financial condition. On the other hand, central station companies and those municipalities owning their own lighting poles are in much better financial condition. One solution of the problem put forward by an interested manufacturer, is to have the lighting company collect sufficient funds to provide steel poles for lighting and charge a proportion of their cost to the electric railways for use as span supports. One company reports some export inquiries.

Current prices are said to be on a level with those prevailing in June, 1916. There was a general drop in prices during the last quarter of 1921. The market at the present moment is firm, and it is doubtful whether there will be any further downward reduction for some time to come. Deliveries are good, ranging from thirty to sixty days on tubular steel poles and one to three weeks on steel towers.

The outlook, manufacturers agree, is for better business all through 1922 than during 1921. The increase is expected to be very gradual but permanent.

Good Prospects for Electrical Exports in 1922

Optimism over the prospects for American exports of electrical equipment this year is expressed by E. D. Kilburn, vice-president and general manager of the Westinghouse Electric International Company.

Mr. Kilburn points out that America leads the world in many electrical lines and can compete with any nation in these lines in spite of her high labor costs. He also states that German competition need not be feared, for Germany's manufacturing capacity is limited, and that when she has obtained a certain amount of electrical business her deliveries will become uncertain and her prices will rise.

During the past year both Chile and Japan placed large orders for electrical material in America and there is every reason to believe that we will receive an increasing amount of business of the same character. Every generator installed immediately creates a market for at least three times its capacity in smaller apparatus, such as transformers, meters, industrial motors and domestic ware. Hence the demand for electric appliances increases in a geometrical ratio and America is in a fair position to get its full share of this rapidly growing business.

Signal Contract Awarded

The Philadelphia & Garrettsford Street Railway has awarded a contract for the complete installation of new electro-pneumatic interlocking at its Sixty-ninth Street terminal, Philadelphia, to the Union Switch & Signal Company. The layout includes forty-three functions, consisting of twenty-one switches and twenty-two signals, which will be controlled from twenty-three working levers in a twenty-three-lever frame electro-pneumatic interlocking machine. Style "C" cut-off switch valves will be used throughout.

All new signals will be of the style "N" color light type. Alternating-current track circuits will be installed throughout the interlocking so as to provide for semi-automatic control of signals and electric detector locking.

Electrification of Swiss Federal Railways

Commerce Reports for Jan. 30 states that 57,000,000 francs have been credited in the Swiss budget of 1922 for electrification of the Federal railways. It is hoped that the electrification of the Bellinzona-Lugano-Chiasso, the Erstfeld-Lucerne and the Goldau-Zug lines will shortly be completed. The Amsteg power station, of 80,000 hp. will be ready to furnish energy about April, 1922, and the Lucerne-Zug-Zurich line will probably be electrified by the end of the year. Together with the St. Gothard, the Sion-Lausanne line is to be electrified, and will be opened in the summer of 1923. The current will be supplied by the 60,000 hp. Barberine station

Lumber Demand Increases After Holiday Slump

Reports from various mill centers to the American Wholesale Lumber Association indicate a slow recovery in lumber demand for the first week after the usual holiday recession. Production was at 68 per cent of normal, new business at 59 per cent of normal, and shipments at 62 per cent. Yellow pine orders exceeded fir orders for the first time since Dec. 3, 1921. On the Pacific Coast both rail and export orders fell off, although moderating weather permitted rail shipments in excess of the last of November, 1921.

ELECTRIC RAILWAY MATERIAL PRICES—JAN. 31, 1922

Metals—New York

Copper, electrolytic, cents per lb.	13.31
Copper wire base, cents per lb.	15.12½
Lead, cents per lb.	4.40
Nickel, cents per lb.	32.00
Zinc, cents per lb.	4.85
Tin, Straits, cents per lb.	32.00
Aluminum, 98 to 99 per cent, cents per lb.	19.00

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.72
Somerset mine run, Boston	1.87
Pittsburgh mine run, Pittsburgh	2.15
Franklin, Ill., screenings, Chicago	1.92
Central, Ill., screenings, Chicago	1.52
Kansas screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard Bessemer steel rails, per gross ton	40.00
Standard open hearth rails, per gross ton	40.00
Railroad spikes drive, Pittsburgh base, cents per lb.	2.22
Tie plates (flat type), cents per lb.	2.00
Angle bars, cents per lb.	2.40
Rail bolts and nuts, Pittsburgh base, cents per lb.	4.12½
Steel bars, cents per lb.	1.50

Hardware—Pittsburgh

Wire nails, cents per lb.	2.50
Sheet iron, (24 gage), cents per lb.	2.85
Sheet iron, galvanized, (24 gage), cents per lb.	3.55
Galvanized barbed wire, cents per lb.	3.15
Galvanized wire ordinary, cents per lb.	2.75

Waste—New York

Waste, wool, cents per lb.	13.00
Waste, cotton, (100 lb. bale), cents per lb.	
White	10.00
Colored	9.00

Paints, Putty and Glass—New York

Linseed oil, (5 bbl. lots), cents per gal.	77.00
White lead, (100 lb. keg), cents per lb.	12.25
Turpentine (bbl. lots), cents per gal.	93.00
Car window glass (single strength), first three brackets, A quality, discount*	85%
Car window glass (single strength), first three brackets, B quality, discount	86%
Car window glass (double strength, all sizes, A quality), discount	85%
Putty, 5 lb. tins, cents per lb.	4.75

*These prices are f.o.b. works, boxing charges extra.

Wire—New York

Rubber-covered wire, cents per lb.	6.50
Weatherproof wire base, cents per lb.	16.00

Paving Materials

Paving stone, granite, 4 x 8 x 4, f.o.b. Chicago, dressed, per sq.yd.	$3.25
Common, per sq.yd.	3.00
Wood block paving 3½, 16 treatment, N. Y., per sq.yd.	2.17
Crushed stone, ¾ in. carload lots, N. Y. per cu.yd.	1.80
Cement, Chicago consumers net prices, without bags	1.97
Gravel, ¾ in. cu.yd. N. Y.	1.75
Sand, cu.yd. N. Y.	1.00

Old Metals—New York

Heavy copper, cents per lb.	10.87½
Light copper, cents per lb.	8.37½
Heavy brass, cents per lb.	5.125
Zinc, old scrap, cents per lb.	2.25
Yellow brass, cents per lb. (Heavy)	5.50
Lead, heavy, cents per lb.	3.62½
Steel car axles, Chicago, net ton	$12.75
Old car wheels, Chicago, gross ton	12.25
Rails (short), Chicago, gross ton	15.25
Rails (rerolling), Chicago, gross ton	12.25
Machine turnings, Chicago, net ton	4.75

Standard Underground Makes Changes in Personnel

The Standard Underground Cable Company, New York City, N. Y., has sent out an announcement of the following changes in its sales organization: Atlee B. Saurman has been appointed general sales manager, with headquarters in Pittsburgh, Pa.. Mr. Saurman has been with the company over twenty years, during which period he served for several years as manager of the Boston office, for twelve years as manager of the Pacific Coast department, with headquarters at San Francisco, and for the past seven years as manager of the Southeastern sales department, with headquarters at Philadelphia, Pa. Edward Kerschner has been appointed manager of the new Southeastern sales department, with headquarters in Washington, D. C. Mr. Kerschner has been for many years past connected with the Pittsburgh and Philadelphia offices and, since it was established, manager of the Washington district office. A sub-office of the sales department will be continued in Atlanta, Ga., with J. A. Peacock in charge as formerly. F. O. Hoyt, formerly and for many years on the staff of the company's New York Sales department, has been appointed manager of the Philadelphia sales department, which department will have charge of eastern Pennsylvania, southern New Jersey and Delaware.

Tramway Concession in India

According to press reports, the Dehra Dun Mussoorie Electric Tramway has been registered in India with the object of building a tramway between Dehra Dun and Mussoorie, the necessary concession having been granted by the United Provinces Government. The preliminary estimate of the cost of the work is 3,662,000 rupees.

Further information relative to this project can be obtained from the Electrical Equipment Division, Bureau of Foreign and Domestic Commerce, Washington, D. C., by referring to Miscellaneous Exhibit No. 229.

Rolling Stock

United Electric Railways, Providence, R. I., has just placed an order for twenty-five new standard type one-man cars with Osgood-Bradley Company. Delivery is promised for March.

Chicago (Ill.) Surface Lines lost seventy-eight passenger cars and twelve miscellaneous service cars in the fire which destroyed the Devon Avenue carhouse on Jan. 26. The property damage was $1,000,000. Further details of the fire are published elsewhere in this issue.

Los Angeles (Cal.) Railway has started reconstruction of 106 cars. The program will occupy the greater part of 1922 giving a maximum number of cars available for the heavy traffic of next Christmas. The cars to be rebuilt are known as P. A. Y. E. No. 2 and they will be converted into P. A. Y. E. No. 1. Instead of a single step at the rear the cars will have a double step divided for exit and entrance. They will be lengthened from 39 ft. 1½ in. to 44 ft. 6 in., giving two more seats and larger loading platforms. The estimated cost of the work is $212,000. A similar program was carried out in 1921. The 1922 work will bring all passenger cars up to modern standards.

The Kentucky Traction & Terminal Company, Lexington, Ky., has purchased ten semi-steel cars for interurban service between Toledo and Sylvania, Ohio. The cars are 40 ft., 3 in. long and have a seating capacity of forty-four. The bodies will have curved sides and the exterior will be finished in chrome yellow. Arch-bar trucks will be used with a 5-ft. wheelbase and 26-in. diameter steel wheels. Other details of the equipment include General Electric type 264 motors, K-35 control, C.P. 27 compressors, G.E. type J-12 headlight with resistors and a 500-watt lamp. The seats will have plush upholstering and automobile spring cushions, and arm rests. The cars are being built by the Cincinnati Car Company, and will weigh 25,000 lb.

Track and Roadway

Dallas (Tex.) Railway is at work installing block signals and electric switches on its Belmont-Vickery line.

Durham Public Service Company, Durham, N. C., is laying new rails on Chapel Hill Street.

British Columbia Electric Railway Vancouver, B. C., will start work right away on the double-tracking of Cook Street.

Shreveport (La.) Railways will start work on filling in its tracks on Jacobs Street, the line in Marshall Street, in Park Avenue and in Lillian Street. The tracks will be plotted with grass.

Kitchener, Ont.—A by-law will be submitted to the ratepayers providing for the raising of $63,000 for extending the railway line east along King Street, for a double track and for the corporation's share of the cost of a station on King Street, east.

Shops and Buildings

Aurora, Elgin & Chicago Railroad, Aurora, Ill., has been authorized by Federal Judge Evan A. Evans to erect an $8,000 freight house at Aurora. This will obviate the necessity for the company to run its freight cars into the business district and will relieve congestion there.

Pacific Electric Railway, Los Angeles, Cal., and the Southern Pacific Company have authorized establishment of a joint freight terminal in Long Beach on the west side of the flood control channel near Seventh Street. Work will start as soon as the city has given permission. The Southern Pacific will abandon its Broadway tracks and freight depot and yards, and the Pacific Electric Company will discontinue its use of the freight yard at Fifth Street and American Avenue. This company will reach the new depot over its San Pedro and Wilmington tracks on Commercial Street.

Trade Notes

Bridgeport Brass Company, Bridgeport, Conn., announces the personnel of its executive staff as follows: F. J. Kingsbury, chairman of the board; Carl F. Dietz, president and general manager; W. R. Webster, vice-president; F. J. Kingsbury, treasurer; R. I. Neithercut, secretary; W. D. Blatz, general sales manager; W. R. Clark general works manager; E. G. Oakley, works manager fabricating division; Arthur Brewer, works manager mill products division.

Dwight P. Robinson & Company, New York, N. Y., already doing large construction work for the Brazilian Government in northeastern Brazil, was awarded the contract for construction of the exposition building which will hold the exhibits of the United States at the Brazilian Exposition in September. The exposition will open Sept. 7 and is in commemoration of a century of Brazilian independence. The White House recently announced that the American building would be constructed and designed for permanent use as embassy headquarters.

New Advertising Literature

The Hardinge Company, Inc., New York, N. Y., has issued a new bulletin, No. 12, on the Quigley fuel systems, comprising the preparing, transporting and burning of pulverized fuels.

Ward Leonard Electric Company, Mount Vernon, N. Y., has issued a booklet describing its various types of "vitrohm" (vitreous enamel) field rheostats. The company is also distributing a four-page leaflet covering the Ward Leonard automatic motor starter of the counter emf. style.

Corliss Carbon Company, Bradford, Pa., has issued a new catalog No. 7 giving information about the selection and application of carbon brushes. This contains data on the physical characteristics of brushes as well as their composition, mechanical details and the various grades of manufacture.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has just published Leaflet 1,825, describing arc welding for repair and reclamation, general applications of arc welding and arc welding for manufacturing processes. A story is told of how costs are reduced by the use of arc welding.